# STATISTICAL ATLAS OF INDIA.

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GOVERNMENT OF INDIA,

DEPARTMENT OF REVENUE & AGRICULTURE.

# STATISTICAL ATLAS OF INDIA.

## (SECOND EDITION, 1895.)

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# PREFATORY NOTE.

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THE Statistical Atlas of India was first prepared in 1886 for the Indian and Colonial Exhibition. Since then another census of India has been taken, and the Atlas has now been revised and brought up to date; its scope at the same time being somewhat enlarged. Its object is to give a general idea, with the aid of maps and diagrams, of the character of the country, its inhabitants, and its resources, and to furnish such leading statistics as may illustrate its commercial, financial, and educational condition.

The maps and diagrams have been printed in the Office of the Surveyor General of India at Calcutta. The explanatory chapters have for the most part been written by persons having special knowledge of the subjects dealt with; and acknowledgments are due to the officers mentioned below, who have contributed the chapters specified opposite their respective names:—

Chapter I.—(Physical Configuration).
Chapter IV.—(Irrigation).
Chapter V.—(Famine).
Chapter XIV.—(Revenue and Rent Systems).
} by Sir E. C. Buck, KT., C.S.I., Secretary to the Government of India in the Department of Revenue and Agriculture (on leave).

Chapter II.—(Geology), by Dr. W. King, late Director, Geological Survey of India.

Chapter III.—(Rainfall and Climate), by Mr. J. Eliot, Meteorological Reporter to the Government of India.

Chapter VI.—(Crops),
Chapter IX.—(Economic Minerals),
} by Mr. George Watt, C.I.E., Reporter on Economic Products to the Government of India.

Chapter VII.—(Forests), by Mr. B. Ribbentrop, C.I.E., Inspector General of Forests.

Chapter XI.—(Prices),
Chapter XII.—(Foreign Trade),
Chapter XIII.—(Finance and Taxation),
} by Mr. J. E. O'Conor, C.I.E., Assistant Secretary to the Government of India, Finance and Commerce Department.

Chapter VIII.—(Horses and Live Stock) is mainly based on information supplied by Veterinary-Lieutenant H. T. Pease, Assistant to the Inspector General, Civil Veterinary Department.

In the maps which illustrate the several subjects treated of, clearness has been secured by the omission of all unnecessary detail. But a map showing the main political and administrative divisions of the country, which will serve as a general index map, has been added at the end of the volume.

DENZIL IBBETSON,

*Offg. Secretary to the Government of India in the Department of Revenue and Agriculture.*

# CHAPTER I.

# PHYSICAL CONFIGURATION.

THE first thing necessary for a proper comprehension of India is that some correct idea should be formed of the size and extent of it. It is for this reason that a skeleton map of England and Scotland is printed in the corner of each of the map sheets in this Atlas. But a mere comparison of areas is not enough. We have to measure quality as well as quantity, seeing that one hundred square miles of desert may be less valuable than one hundred acres of fertile land. In view of the fact, therefore, that Egypt proper, *i.e.*, inhabited and cultivated Egypt, excluding the desert wastes, is of all countries west of the Suez Canal more like India than any that are familiar to an English student, a rough comparison will at the outset of this chapter be offered between India and Egypt proper.

The first step will be to compare Egypt proper with one province, say the North-Western Provinces, excluding Oudh.

This Indian province is, for purposes of administration, divided into seven "divisions," each controlled by a separate official, called "a Divisional Commissioner." Now assuming the cultivated area of Egypt to be 5,000,000 acres, we find that in cultivated area the largest division is equal to one Egypt and a quarter, four others are each equal to three-fourths of an Egypt, while the other two are something less.

Now let the final map of the Atlas be pulled out and the names and boundaries of the ten British provinces, exclusive of the Native States, be observed. Applying the Egypt unit we find that, comparing cultivated areas,—

| | | |
|---|---|---|
| Bengal is about | equal to | 10 Egypts. |
| Madras is about | ,, | 6 |
| The North-Western Provinces (5) and Oudh (1½) | ,, | 6½ |
| The Punjab is about | ,, | 5 |
| Bombay is about | ,, | 7 |
| The Central Provinces are about | ,, | 4 |
| Assam is about | ,, | ½ |
| Burma is about | ,, | 2 |
| Berar is about | ,, | 1 |
| TOTAL BRITISH PROVINCES | | 42 Egypts. |

We need not venture into the area of the Native States and of the large number of Egypts which they would absorb; but some judgment may be formed of their size by comparing the space which they occupy on the final map in this Atlas with that taken up on the same map by British provinces. We may now turn to another consideration. In comparing the areas of British provinces and Native States, it must be borne in mind that, as a rule, the former are much richer in soil and fertility than the latter. But British possessions differ in value too, and it is extremely important to try and get hold of some general notion of what that difference is, and of the causes which lead to it. To this end, it is essential that maps and charts of Indian Physical Geography should be studied, and it may assist those who wish to adopt this course and to begin by condescending to become students of this statistical Atlas, if they will permit themselves to be addressed for the moment as an audience in a lecture room.

In the first place, you will be asked to keep in view, while reading this and succeeding chapters, the final map in the series, in order that you may acquire a distinct idea of the name and position of each province or state which is under your notice at the time. You are next asked to try and form a distinct conception of the distribution of high and low land, or, in other words, of undulating broken country and of flat alluvial plain. To this end a brief study of the "Physical Configuration" map attached to this chapter is desirable.

The first thing to notice is the Himalayan range. It is not too much to say that India owes a great part of its wealth and fertility to the existence of this mountain chain which stands up like a high wall, bounding and protecting a rich garden.

The Himalayan ranges stop and hold the vapour blown in from the sea, and give it back to India in rains and fertilizing streams. Beyond lie the steppes of Asia dry, or arid, and unprofitable. Most of the rain and snow that falls on the slopes of the Himalayas descends in the large rivers, watering the Punjab at the one end, and the North-Western Provinces and Oudh and Bengal at the other.

But more than this. Even the drainage that flows down the north side of the great mountain wall is carried half to the east and half to the west in the two mighty rivers which become the Indus and the Brahmaputra respectively, hugging, you may notice, the very foot of the wall, until they are able to find openings through which they burst their way southward into the Indian Continent. Thus the northern drainage to which geographically the Trans-Himalayan region would seem to have a prescriptive right is almost unfairly captured by India, and by its fertilizing service frees its master from all fear of rivalry from the lands beyond the mountain zone.

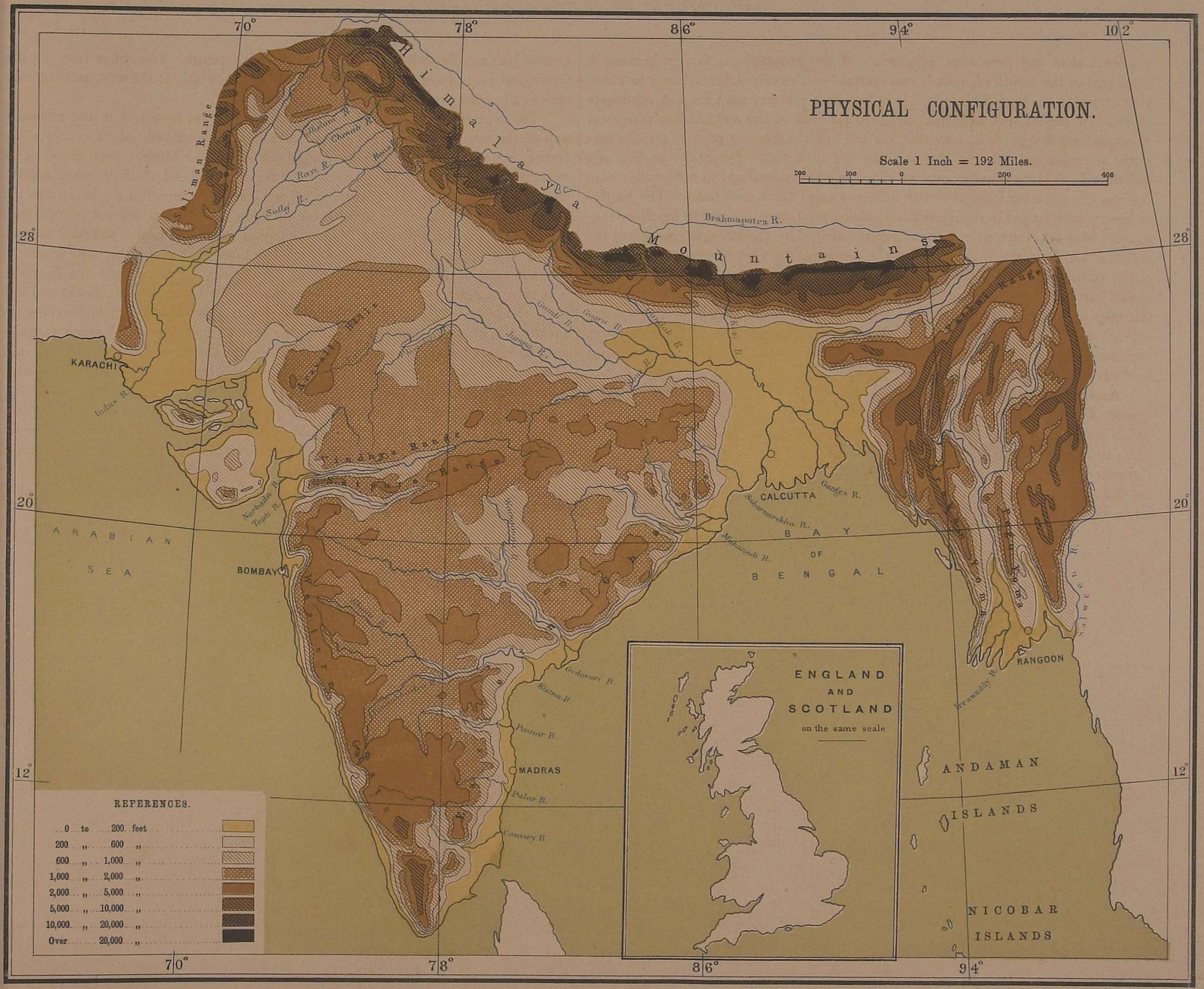
While your attention is thus directed to the inpour of the Himalayan waters you will observe what is perhaps the most important geographical feature of the Indian Continent, *viz.*, the existence of a broad unbroken alluvial plain stretching from the north of Bombay through the Punjab, the North-Western Provinces and Oudh, and Bengal to Calcutta. If some convulsion of the earth were to raise the ocean level something more than 1,000 feet all this land would be flooded; the Himalayas would, as perhaps they once were, be cut off from the Continent of India by a new Mediterranean; the Bay of Bengal and the Arabian Sea would meet, and the Central Provinces, Bombay, and Madras would float as an Island, not bigger than Borneo, in the midst of the Indian Ocean. Now the reason why you are asked to

acquire a vivid and permanent conception of this geographical fact is because a great part of the wealth of India is concentrated on this belt of alluvial land to which your attention has been directed. It is here that you may see unbroken continents of wheat, of millets, and of Indian corn, endless seas of rice and limitless prairies of sugarcane and indigo; it is here that you will find the teeming populations, the net-works of canals and railways, the seething life of India. Down the ancient sea bed the tide of Muhammadan invasion ebbed and flowed, and up this same valley from the east the opposing force of British influence crept hand over hand. The battles of history were fought in the intermediate plains, until, step by step, the desultory con-querors from the North were beaten back or subdued by the stronger energies of the seaborne foes from the West, and peace and tranquillity were restored to millions of raiyat cultivators, who, while battle raged over their heads, ploughed and reaped annual harvests on this wide-spreading belt of fertile soil. Compare the first with the last map in this Atlas, and you will see how there are imbedded in this uplifted sea-valley four of the richest provinces of India—first Bengal, then the North-Western Provinces, then Oudh (" The Garden of India "), and, finally, the Punjab (" The wheat field *par excellence* of the Empire ").

Ascending now from the alluvial bed towards the south, you find three small chains of hills—the Aravalli, Vindhya, and the Satpura ranges,—round and beyond which is a plateau of land of an elevation of from 2,000 to 3,000 feet, occasionally rising to a greater height. This is drained to the north by the Sone river, joining the Ganges; to the west by the Tapti and Narbada; to the west and south-west by the Sabarnarekha, the Mahanadi, the Godavari, and the Kistna. In these high-lands lie the Native States of Central India, the Central Provinces, and the greater part of the Bombay Presidency and Hyderabad. You must turn to the Geological map to see the two great divisions of black soil to the west and archæan rock to the east.

The one remarkable feature which you have yet to notice is the mountain wall on the west coast broadening out into a sort of dumb-bell, which occupies the Native States of Mysore and the central portion of the Madras Presidency. This western wall, rising to its extreme height at the southern end of the Peninsula, plays an important part in the distribution of rain over Southern India. It arrests the vapour-bringing winds of the south-west monsoon, and, as you will see on reference to the rain map, deprives the country lying to the lee of it of a sufficient rainfall. Nearly the whole of the drainage flows down towards the east, the most important rivers in addition to those named being the Penner, the Palar, and the Cauvery. The alluvial *detritus* brought down by these streams forms in their deltas and in a strip along the coast an important area of rich alluvial soil which provides the greater part of the agricultural wealth of the Madras Presidency. A much narrower strip of highly fertile deposit at the western edge of the Ghâts gives to Bombay and Madras a ribbon of extremely valuable land and forms the chief wealth of the little State of Travancore.

Brief and rough as the above description has been, it is sufficient to indicate how necessary it is to seek in the physical configuration of India a key to the distribution of agricultural wealth, upon which in its turn depends the distribution of the population itself. Every succeeding chapter in this Atlas should be read in the light thrown upon the subject with which they deal by a general knowledge of the physical configuration of the country.

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NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

Litho., S. I. O., Calcutta.

## CHAPTER II.

# GEOLOGY.

INDIA, taken as a whole, in its greater geographical and geological features, may be described under three vast areas. First, and to the southward, there is a Peninsular Region with some lofty mountain masses, and a very great extent of high upland flanked by broad stretches of more or less broken and hilly country, in and around all of which are wide expanses of plains and low-lying land. Second, all along the northern edge of this peninsular region, there lies the wide belt of the proper plains of India, extending from Lower Bengal and Assam on the one side, by Hindustan proper into the Punjab and thence by the Sind desert to the shores of the Northern Indian Ocean; which is distinguished as the Indo-Gangetic alluvial tract. Third, and framing the Empire as it were by natural barrier mountain land, comes the Extra-peninsular Region beginning at Cape Monze (Sind) on the west and passing right round by the Baluchistan and Punjab hills and the Himalayas and through Assam by Burma to Victoria Point on the extreme south-east. The plains tract is clearly separable from the two other regions as an essentially alluvial, and, thus recent, area: extra-peninsular India is a region of fossiliferous marine rocks of many ages, though its age as a mountainous tract is comparatively recent in geological history: and peninsular India is a land of few and scattered marine formations, the greater spreads of its stratified rocks being of fresh-water origin.

Detailed examination of the extra-peninsular region has as yet only been made in widely separated areas, so that the want of continuity and obscurity of succession in many of its formations prevent any but incidental reference to its geology in this chapter. At the same time, attention should be kept on the essentially marine facies of its formations, as well as on the wonderful structural evidences of a regional movement, whereby those very marine deposits were heaved up in an involved wrinkling of the earth's crust to be subsequently denuded or carved as it were into the Himalayan slopes and heights on which they are now exposed.

For the rest of India, there is a much simpler succession and less complicated distribution of formations:—

1. ALLUVIAL.—(Recent and sub-recent.)
2. TERTIARY AND CRETACEOUS: and 3. BASALTIC.
4. GONDWANA.
5. VINDHIAN.
6. ARCHÆAN.

*Recent and Sub-Recent.*—The superficial accumulations of æolian, river, lake, marsh, and estuarine material can easily be disposed of as being, with one or two exceptions, just the same kinds of dust, sand, soil, clay or mud which are exhibited all the world over, though they are here disposed in vast areas, such as the Indo-Gangetic tract; or the plain of the five rivers; or the great desert of Rajputana; and to a lesser degree, though persistent and continuous for hundreds of miles, as the coastal alluviums and blown sands.

A newer and an older alluvium have been distinguished, the older being recognised as containing the chipped implements of palæolithic man and species or varieties of animals and plants which are now extinct. Rangeable next the older alluvium may be mentioned the very remarkable *Cotton-Soil* or *Regur* which occupies immense tracts in the Deccan and lesser areas far down in Southern India, and must have been formed when a much moister climate prevailed over the western and southern portion of the country. In a smaller way there appears to be some association of another peculiar Indian deposit, namely, *Laterite*, with the older alluviums. A very noticeable feature of the Gangetic valley alluvium is its undoubted fresh-water, or, at the utmost in its seaward deltaic portion, estuarine origin; no marine remains or evidence of sea action having been disclosed even in the deeper borings at Calcutta, Lucknow, Agra, and Amballa. Other alluvial stretches and ordinary superficial deposits, such as soils, inland blown sands, and talus debris are spread out at all levels over the surface of the country; and some of them contain the smoothed stone axes and other evidences of pre-historic man.

*Tertiary, Basaltic, and Cretaceous.*—In the map illustrating this chapter these three formations are conveniently and yet unsatisfactorily indicated by only two colours: unsatisfactorily as regards the tertiary and cretaceous which in England are recognizable as very distinct formations, and yet conveniently because in India they are connectable by a series of passage beds; while the basaltic rocks, or more properly the Deccan trap series, which in some features represent this period of passage or transition, are so enormously developed that they must be represented by the separate colour given.

The well-known Siwalik formation, called after the foot-hills of that name, flanking a part of the Himalayas, and so characterised by the wonderful series of fossil remains of animals, is the newest division of the Indian tertiaries; and both it and the lower and middle tertiaries are represented all along the toe of the whole mountain range, as well as in the outer hills of the Punjab, Baluchistan, and Sind. In Peninsular India the Tertiaries are represented only at Perim in the Gulf of Cambay, and in Kathiawar; though certain fossiliferous rocks near Quilon in Travancore (later than nummulitic), and near Ratnagiri on the same coast, and some of the red ferruginous sandstones of the East Coast, near Rajahmundry, Nellore, Madras, Pondicherry, Cuddalore, and in the Tinnevelly district may ultimately be found to be of upper tertiary age.

*Deccan Trap Formation.*—The next period in Indian geology was one of a tremendous outburst of volcanic basalts with ash beds, which took place between

the eocene and cretaceous; the oldest volcanic outbursts being of uppermost cretaceous age. Associated however with these traps are infra-and inter-trappean beds of lacustrine origin, the fossils of which have a prevalent tertiary aspect, though in one case near Rajahmundry in Southern India these fossils are of estuarine, almost marine origin, with cretaceous affinities. This remarkable display of volcanic rocks occupies nearly a third of the peninsula and extends thence into Central India. Large outliers occur also in Kathiawar, Cutch, and Rajahmundry; and there is a further occurrence of volcanic rocks in Rajmahal (Bengal), which is however preferably looked upon as belonging to a much older series. While displayed in all its immensity of spread over the Deccan, being traversable by railway east-north-eastward from Bombay to Nagpore for 519 miles, and thence by breaks to Umarkuntak and beyond by plateau outliers into Chota Nagpore, or again for 370 miles south-eastward towards Madras; it is magnificently prominent as to its thickness in the Western Ghâts, which are but a portion of the long western scarps of successive sheets of trap, with some ash beds, extending from Neemuch in Central India to nearly 100 miles south of Vingorla. It appears to have been more of a fissure irruption series of outbursts over a then existent land surface than one of discharge from volcanic foci, of which last there are only a few indications extant near Bombay, and perhaps also at the strange Lunar lake east of Jalna in the Nizam's dominions: while it must have lasted through an immense period of time, broken by intervals of quiescence, as represented by the infra-and inter-trappean deposits of clays, limestones, and sandstones with their fossil remains of terrestrial plants, small crustaceans, a few insects, fresh water mollusca, fish and reptiles.

*Cretaceous.*—This formation is represented in Southern India, between Pondicherry and Trichinopoly, by three groups of splendidly fossiliferous beds correlatable with the Upper Chalk, the Lower Chalk, and the Chalk Marl and Upper Green-sand of England. Many of the fossils of the Trichinopoly region have also been found in the cretaceous rocks of the Khasi Hills between Assam and Sylhet. There are again cretaceous rocks in the western portion of the Narbudda valley about the town of Bagh, and so on to the neighbourhood of Baroda; and they are considered to be representative of the lowest or Utatur group of Southern India; that is, equivalent to the chalk marl and upper green sand of England or Cenomanian of France. Other peninsular occurrences are in Kathiawar. In extra-peninsular India different members of the cretaceous formation are found in Sind, in the Sulaiman Range, in Afghanistan, in the Himalayas, in Assam, and in Burma.

*Gondwana.*—The next older formation in peninsular India is the great Plant-bearing Series, in the lower division of which are found the chief coal-measures of the country, though the upper division itself is not devoid of coal. (Coal is at the same time not restricted to the Gondwana series, as it occurs in the cretaceous and tertiary rocks of Assam, Burma, the Punjab and Baluchistan, and there is even coal, though worthless, in rocks of carboniferous age in Burma.) The series is mainly distributed over the country which was dominated by the aboriginal race of the Gonds, or Gondwana, hence its name, and it consists of an upper and lower division, the lower approximately rangeable with the permian and triassic periods of European geology, and the upper with the jurassic. The lower Gondwan as begin at the bottom with the Talchir group (partly of glacial origin) and rise through the Damudas and Panchets (of Bengal proper), being characterised rather more particularly by an *equisetaceous* and *fern* flora; above which come unconformably the upper Gondwanas (Rajmahal and Jabalpur), which are specially characterised by a prevalence of *cycads* and *conifers*, also associated with *ferns*. Animal life is only known in the Talchirs and Damudas by labyrinthodont and dicynodont remains, while for the upper Gondwanas, in the Central Provinces, there are the exuviæ of ganoid fishes with liassic affinities, and amphicœlian reptiles of triassic age. The whole series is essentially a sandstone series of lacustrine or river accumulation, though members of the upper division are associated with marine deposits at widely separated localities on the east coast of Madras, and in Kathiawar, Cutch, and Jessalmir. In extra-peninsular India, true lower Gondwana plant beds occur on the lower slopes of the Himalayas below Darjeeling, and the Talchirs are represented in the Salt Range in the Punjab.

*Vindhian.*—The next older series takes its name from a peninsular feature, *viz.*, the Vindhian range of hills in Central India, a considerable portion of which is built up of these rocks; but as to even its approximate age, with reference to the Gondwanas, no more can be said than that it is much older, though still perhaps of lower palæozoic age. The Vindhians are unfossiliferous, and absolutely devoid of any close relationship with the formations already described, which are always found to overlap them with decided unconformability; and they present, when not weathered, a more or less altered or metamorphosed appearance. Hitherto we have had to deal with ordinary sedimentary rocks, whereas in the Vindhians we have the oftener to describe somewhat altered sandstones (quartzites), limestones (marbles), and shales (clay slates), while the strata are at times very strongly folded and squeezed. On the whole, however, the Vindhians may be considered a sandstone series, with some limestone groups, of generally fresh water deposition, though pelagic conditions must have prevailed at different times. In other words, a considerable portion of the northern half of the peninsular region must have been, in that distant period, still a considerable land area. The series is divisible into two, both of which are well displayed in Central India, in Bundelkhand and Rewa; also in the Chhattisgarh basin of the Central Provinces, and thence southwards over Bustar, down the Godavery valley, and in the Cuddapah and Kurnool districts of the Madras Presidency.

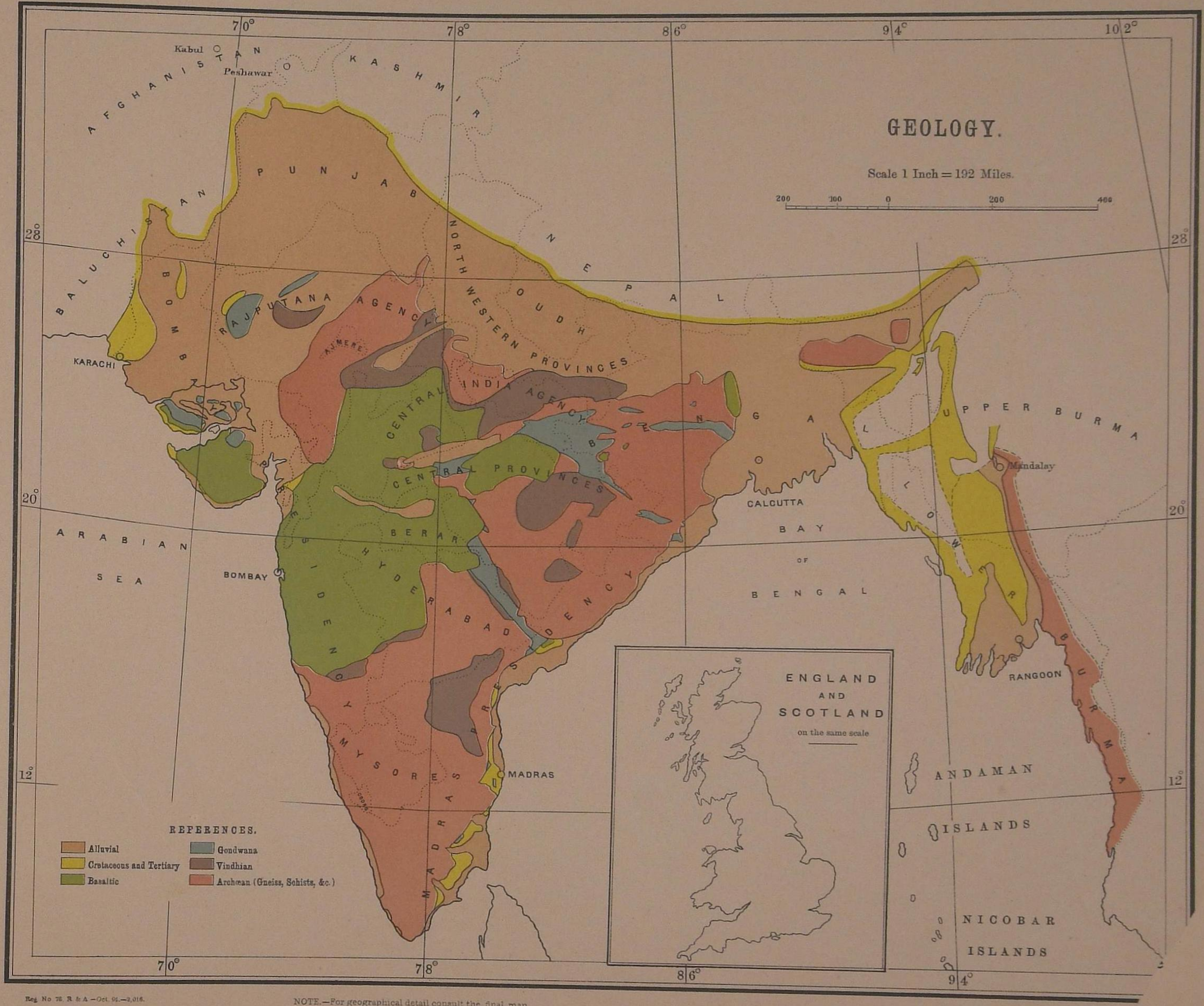
*Archæan.*—The formations described so far are distributed in larger or smaller areas, each being found disposed or resting in one place or another, on a basement or floor of obviously much older rocks, which in peninsular India are eminently persistent from Cape Comorin on the south, to Delhi on the north, to Rajmahal on the north-east, and to beyond Mount Abu on the north-west. Rocks of like kind, though not so evidently basal, or always so obviously archaic, constitute immense belts in the Himalayas and in Assam and Eastern Burma. This system, however much it may be differentiated by regional distribution or by petrological and stratigraphical relations, is distinctly recognisable as a more or less crystalline one of schistose, gneissic, or granitoid rock divisions; and thus it is shown in the appended map under one colour, although it is really separable into a transition and a thoroughly crystalline series.

The Transitions are mainly schists, with frequent alternations of quartzites, and often accompanied by crystalline limestones and dolomites, among the whole of which are numerous intrusive and interbedded basic igneous rocks and ash beds. Such rocks are extensively and complexedly developed in the great Rajputana belt of the Baroda, Udeypore, Ajmere and Delhi country, which is dominated by the

Aravalli range of mountains. Similar transition rocks occupy considerable tracts in the Central Provinces about Bhandara and Jubbulpore, and may be followed thence eastward to the banks of the Ganges at Monghyr: they also characterise a very broad area in Chota Nagpore. In Southern India there is a great series of long and wide N. N. W.—S. S. E. belts of these rocks in Dharwar, Mysore and Bellary, which have been grouped under the name of the Dharwar series. In all these areas the transitions are found in more intimate association with the older crystallines, among which they are folded and faulted, than with any of the newer formations. The transition series is on the whole the most decidedly metalliferous formation of India: in Madras, as the Dharwar series, it is the home of auriferous occurrences; in Chota Nagpore, it has a varied metalliferous constitution.

The proper Crystallines, or the gneisses and gneissoze granites, occupy most of Southern India, Western Bengal and Bundelkhand, and even they show strong indications of sub-divisional groups, the Bengal-Bundelkhand gneisses being preferably considered as the older.

The whole of the transition and crystalline country is of course seamed with dykes and veins of intrusive igneous rocks; but other truly irruptive occurrences are the mountain masses of the Madras Presidency, which, though they have remained as the dominant features of the peninsular region since upper palæozoic times at least, thus bearing witness to the extreme age of its land surface, were originally existant as igneous magmas pent up in the profounder cavities of this section of the crust of the globe.

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NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

Litho., S. I. O. Calcu.

# CHAPTER III.

# RAINFALL AND CLIMATE.

INDIA, meteorologically, consists of two portions, the conditions in which are to some degree opposed. The first includes the area between the Himalayas and Vindhyas, the greater part of which is occupied by the two river plains of the Ganges and Indus with their tributaries, and may be termed Extra-Tropical India. The remaining portion comprises the whole of India to the south of the Vindhyas, and may be termed Peninsular or Tropical India. It consists of a narrow belt of low land along the sea coast and of a triangular-shaped plateau of moderate elevation, averaging about 2,000 feet, lying between the West and East Ghâts.

As India is walled off from Central Asia by the Himalayas, the meteorological changes in Central Asia exercise little direct influence on the weather in the plains of Northern India. The Himalayan mountain barrier is of great importance, as it shuts India off from the cold air currents of Central Asia, and isolates it from the Thibetan plateau. The great extension of its snow-clad surface during the cold weather not only modifies the temperature and humidity conditions in Northern India at that time, but occasionally affects very largely the distribution of the monsoon rains.

The plateau in Afghanistan is also an important factor in the meteorology of India during the cold weather. Its elevation is such that the winter precipitation occurs as snow over the whole plateau area, and hence there is, during each winter storm, a large extension of snow-clad surface which for some time after affects largely the climate of Northern India. Each storm gives rise to, and is followed by, a cool dry wave that advances eastwards and reduces temperature and humidity largely below the normal over the whole of Extra-Tropical India.

The Himalayan mountain area and the plateau of Iran are hence the two chief land areas external to India which exercise an important influence on its meteorology. Their influence is chiefly felt during the north-east monsoon, giving it what is termed a *continental climate*, the characteristics of which are the prevalence of land winds, great dryness of the air, large diurnal range of temperature, and little or no precipitation.

The other area external to India, which profoundly affects its meteorology, is the ocean to the south, including the northern half of the Indian Ocean and its arms, the Bay of Bengal, and Arabian Sea. Its influence gives India during a part of the year an *oceanic climate*, the chief features of which are great uniformity of temperature, small diurnal range of temperature, great dampness of the air, and more or less frequent rain. The former or continental type of weather prevails over nearly the whole of India (with the exception of certain coast districts) during the period December to May, and the latter or oceanic type from June to November, thus giving rise to the two great meteorological divisions of the year: the dry season or north-east monsoon, and the rainy or wet season or the south-west monsoon (so named from the direction of the prevailing winds in the Indian seas). A climate in which such reversal of winds and meteorological conditions occurs periodically, and is primarily due to thermal actions, is termed a monsoon climate, and India is *par excellence* the type of a tropical monsoon climate.

The chief factor in India itself, determining its climatic features, is the solar action, depending upon its position on the earth's surface. About one-half of its area lies to the south of the tropic, and for some time during the summer is heated beneath the rays of a sun vertically overhead at noon. The Burma and Malay peninsula to the east of the Bay of Bengal is also included in the torrid zone. On the average of the whole year these are the warmest regions. Except, perhaps, for a few weeks in December and January, and then only near its northern limit, there is in this zone no season of the year that can properly be called cold. But it is not within the torrid zone in India that the cumulative action of the sun's power in giving high temperature is manifested in its greatest intensity. The cumulative effect is dependent as much upon the length of the daily period of the sun's action as upon his meridian altitude. It is in the almost rainless plain of the north-western corner of India traversed by the Indus river that the summer heat attains its greatest intensity. The highest temperatures in that area are usually experienced during the last week of May, and occasionally exceed 120°. The hottest part is the plain of the Pat or Cutchee desert that stretches from the banks of the Indus to the foot of the Bolan Pass, where the heat is probably as excessive as in any part of the Sahara. But with the later autumn comes relief, and four or five months of a climate comparable with that of a South Italian winter succeed and in some degree compensate for the intensity of the summer heat.

Somewhat further north again, in the most northerly corner of the Punjab plain, the contrast between summer and winter is still greater. The summer heat in the North and West Punjab falls but little short of that of the Pat, and the winter is positively cold, and snow has been known to fall to some thickness in the Rawalpindi and Hazara districts on plains less than 2,000 feet above the sea-level. It is in the Punjab that the annual revolution of the seasons is marked by the strongest contrasts of temperature and of rainfall.

Very different is the climate of Assam, which in virtue of its constant high humidity has an alternation of summer and winter, of which neither is extreme in its temperature. The rise of temperature, which in most other parts of India follows rapidly on the vernal equinox, is, in Assam, checked by frequent showers and thunderstorms, giving it a heavy rainfall during the spring or hot weather months of March to May.

Three very distinct types of climate are presented within the limits of India, though united by innumerable intermediate gradations, *viz.*—the damp and uniform, but moderately warm, climate characteristic of equatorial regions, best represented by the coast districts of Travancore and Malabar; the annual alternation of extreme

heat with great cold, excessive dryness, and rare and scanty rainfall which characterize the West Punjab and Upper Sind; and lastly, the perpetual damp, frequent and heavy rainfall, and moderate temperature changes of a warm summer and a cool winter, which especially distinguish the valley of Assam.

The dominant feature of the meteorology of India, as already stated, is the alternation of the monsoons or reversal of the prevailing air currents in India and the adjacent seas, and hence the primary division of the year into the north-east monsoon and the south-west monsoon. It is convenient, for various reasons, to subdivide each of these two periods into two seasons, and hence the year for meteorological purposes is divided into four seasons according to the following scheme:—

*1st.*—The cold weather, including the months of January and February.

*2nd.*—The hot weather, comprising the months of March, April, and May.

*3rd.*—The south-west monsoon proper, including the months of June, July, August, September and October.

*4th.*—The retreating south-west monsoon period, including the months of November and December.

The first plate below comprising four charts represents the mean distribution of temperature during the four seasons of the year. This is done in the usual way by lines of equal temperature or isotherms, the value of each being noted in figures. An examination of these charts shows at a glance the chief features of the temperature conditions of the country. Temperature is nearly constant in Southern India the whole year round. In the retreating south-west monsoon period and the cold weather period, the lines of equal temperature run east and west across India parallel to the lines of latitude, and hence the temperature at that time depends mainly upon the sun's meridian altitude. In the cold weather season the mean temperature averages about 30° lower in the Punjab than in Southern India. During the hot weather, the interior of the Peninsula and Northern India is greatly heated; and the contrast of temperature is not between Upper and Southern India, but between the interior of India and the coast districts and the adjacent seas. This is shown on the charts of the period by the isotherms running parallel to the coast and forming closed curves, about a central closed curve (that of the isotherm of 90°), which includes the greater part of the Deccan and Central Provinces, and hence represents on the average of the whole period the hottest area during the hot weather in India. The coolest parts of India during this period are Assam and Malabar, where the mean temperature is about 15° lower than in the Deccan. The area of greatest mean temperature is usually transferred northwards in May to Upper Sind, North-West Rajputana, and the South-West Punjab, where mean daily temperatures of 100° to 105° and maximum day temperatures of 120° are of occasional occurrence. The change from continental to oceanic conditions in India occurs in the month of June, and that month and the following four months are characterised by remarkably uniform temperature conditions in India generally. Over nearly the whole of the Peninsula, Central and North-Eastern India, the mean temperature ranges between 80° and 85°. Upper Sind, the South-West Punjab, and North-West Rajputana form the hottest area, and have a mean temperature slightly exceeding 90°.

The most interesting, as well as the most important feature of the meteorology of India, is the rainfall. The mean distribution of the rainfall in each of the four seasons of the year is represented in the four charts of the first plate below and the annual distribution in the second plate.

The last months of the year (November and December) are, as a rule, characterized by cool dry weather and cloudless skies in Northern India, and by more or less cloudy and rainy weather in Southern India. During the next two months the conditions are reversed. Fine weather with clean or lightly-clouded skies and moderately high temperature holds steadily in Southern India, whilst occasional disturbances occur in Northern India and give it light to moderate showers. These disturbances are, as a rule, due to the passage of shallow depressions across Northern India. These sometimes originate in Rajputana and Sind, but more frequently in Baluchistan and Persia, and generally advance eastwards with a nearly uniform velocity of 350 to 450 miles per diem. The rainfall accompanying the majority of these storms is very light in the plains of India, and occurs chiefly in the submontane districts of Northern India, and more especially of the Punjab. The disturbances in all cases give more or less heavy and general snow in the Western Himalayas, and by far the larger proportion of the snowfall in these mountains occurs during this period. The first chart of the first plate exhibits the distribution of the winter rainfall in the plains of India. The rainfall is less than one inch in amount over the whole of the Peninsula, and is largest in amount along the foot of the Himalayas in the Punjab and North-Western Provinces and in Assam, where it ranges from 2 to 5 inches. No attempt is made in the chart (in the absence of sufficient data) to show the distribution of the precipitation in the Himalayan area.

The distribution of the rainfall of the second or hot weather period of the year is shown in the second chart of the first plate. The rainfall is due to quite different causes from that of the preceding period. During the hot weather period temperature increases rapidly in the interior, over the greater part of which dry hot land winds, similar in direction to those of the cold weather, but of much greater intensity, obtain. In virtue of the sharp contrasts of the temperature conditions of the sea areas and the interior of India, strong land and sea breezes prevail in the coast districts. These sea breezes extend further landwards and seawards with the increasing intensity of the hot weather, and are most strongly developed at the head of the Bay. These sea winds introduce a considerable amount of moisture into the interior of India. The large and rapid convective action which occurs during the hottest period of the day favours the frequent occurrence of the classes of local disturbances or storms due to intense thermal action. In the drier districts of the interior the storms are usually rainless and known as dust-storms, but in the areas affected more directly by the humid sea breezes, they are usually accompanied with much rain and hail and violent electric action. These thunderstorms are most frequent in Bengal, where the damp local sea winds are strongest, and in and near the hills of Northern and Southern India. Tenassserim, Lower Burma, and Southern India (more especially Malabar) also occasionally receive bursts of rain from early temporary advances of humid winds in the month of May. The rainfall chart of the period shows that the rainfall is small in amount over the interior, and is least in the driest districts. It exceeds 5 inches in Burma, Bengal, Orissa, and the west coast districts, and is greatest in Assam, where it ranges from 20 to 50 inches in amount.

The south-west monsoon currents usually set in during the first fortnight of June on the Bombay and Bengal coasts, and give more or less general rain in nearly every part of India during the next three months. The monsoon pours into India in very different measures across the west and east coasts, and in consequence distributes its rain very unequally. On the west coast it blows directly, or almost directly

athwart the coast line, and discharges an enormous amount of rain on the face of the West Ghâts. In the Bay of Bengal it blows from the south-west, and, passing by the Coromandel coast and the Carnatic, to which it furnishes, at the utmost, an occasional shower, it only begins to cross the coast line to the north of the Godavari river, where the direction of this line changes from north to north-east. Between Masulipatam and Orissa the rainfall is rather greater, but it is not until the monsoon reaches the shores of Bengal that it pours in volume into the country, bringing the abundant rains of Bengal, Assam, and Cachar. To the north of Bengal the Himalayan chain opposes itself to the course of the current, and diverts a considerable portion of it towards the west and north-west, carrying rain to the plains of the North-Western Provinces and Oudh. It is, however, only a portion of the current that is thus diverted. Another part blows full on the face of the Garo and Khasi hills, which separate the Assam valley from the plains of Sylhet and Cachar, and the forced ascent of the air caused by this obstacle to its passage gives rise to the enormous rainfall (upwards of 500 inches in the year) which has made Cherrapunji famous as the wettest of known places. Only less heavy is the rainfall of the Arakan coast, which also opposes itself, though somewhat obliquely, to the course of the current. It has a hill range running parallel with it at no great distance inland, and this range has to be crossed by the wind before it can reach the upper valley of the Irawadi, and hence the Irawadi valley (with the exception of the plain of Pegu) has a comparatively small rainfall.

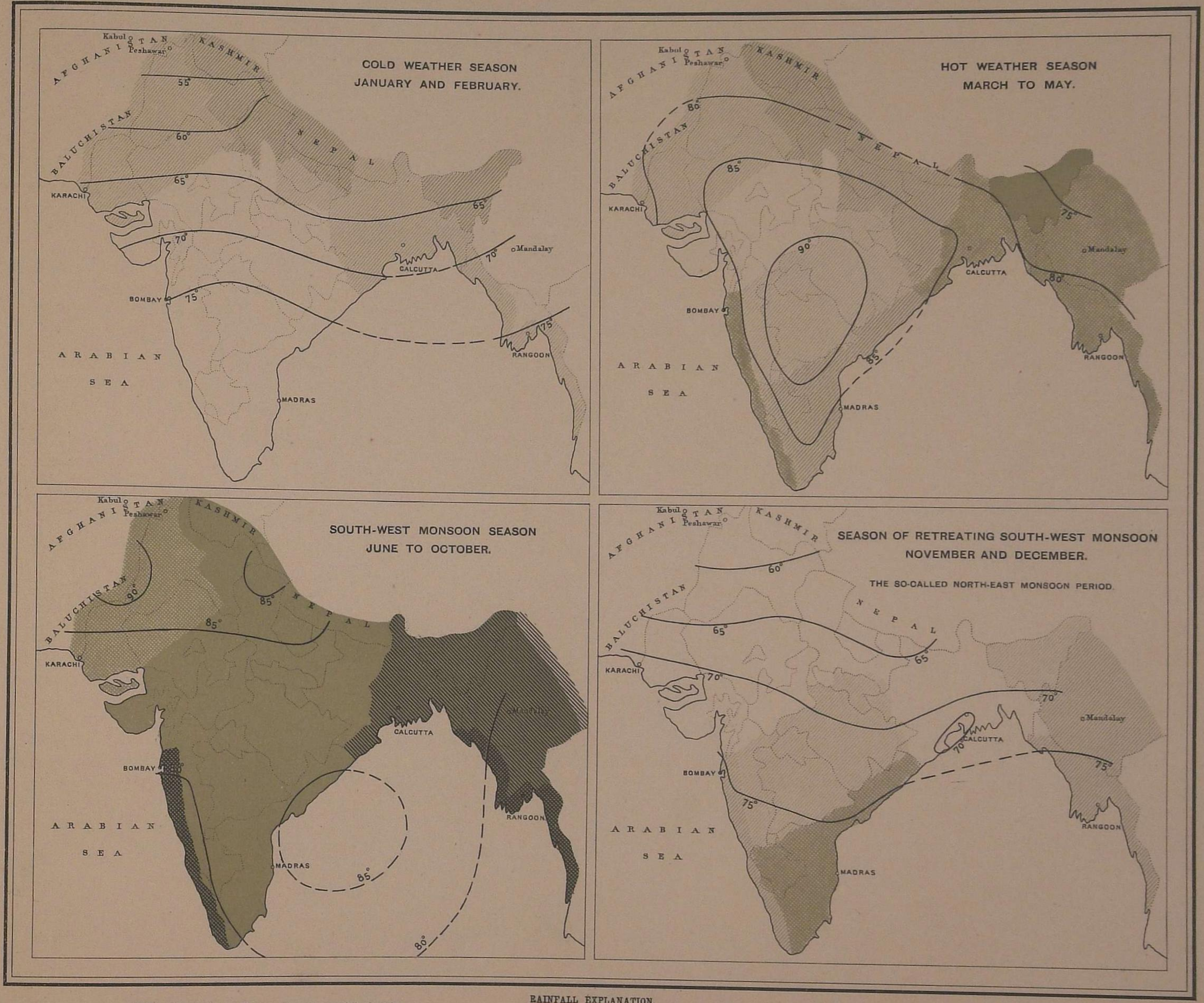
The western branch of the monsoon, after surmounting the Ghâts, blows across the Peninsula as a west and sometimes, in places, as a north-west wind. On the western face of the Ghât range, the rainfall is excessive; but beyond it, on the Deccan table-land, it rapidly diminishes to less than one-sixth of the average fall on the west coast. And on the Mysore and Bellary table-land, or on the plains of the Carnatic, from June to the middle of October, the rainfall is very scanty. To the north of the Godavari in Hyderabad and the eastern provinces of the Peninsula, the rainfall is more frequent and abundant. The dry zone in which rain is most scanty and precarious is hence limited to a strip 100 to 200 miles in width in the Western Deccan, parallel with the Ghâts, and it is this part of the Deccan, together with the Mysore table-land and the Carnatic, which is most subject to drought.

In the north of the Peninsula extending from Bengal nearly across India is a broad band which includes the Satpura range, Chota Nagpur, the greater part of the Central Provinces and Central India, Orissa, and Bengal. In this region the monsoon rainfall is abundant, and is also more regular and certain than in most parts of India. The storms which during the monsoon are generated off the coasts of Bengal usually traverse this region and their passage westwards is accompanied with heavy rain not infrequently flooding the rivers. Rainfall rapidly diminishes to the north-west from that belt. Southern and Eastern Rajputana, Gujarat, Cutch, and Lower Sind, are indeed swept during the summer monsoon by strong west winds, and a branch of the Bombay current blows pretty steadily through Rajputana towards the Punjab, carrying some rain to the latter province. But the strong west winds of Cutch and Gujarat are only in part fed from the ocean reservoir which furnishes to the monsoon its abundant vapour. In Baluchistan and Persia the prevailing wind throughout the season is from north-west, and the monsoon which blows from the west across the north of the Arabian Sea is to some extent fed by these winds with dry air from Arabia, Persia, and Baluchistan, and hence is converted into a comparatively dry and rainless current. The further we proceed north and west, the more rapidly does the rainfall diminish, until at length in the Pat desert the limit of the monsoon rains is reached.

An important feature of the south-west monsoon is that the humid rain-giving currents are by no means steady. Strong monsoon winds with more or less general rain prevail for several days. The winds then fall off, and the rainfall diminishes in amount and tends to occur chiefly as local showers. These changes are most marked in the extreme limits of the monsoon current in North-Western India. The intervals between the strong bursts of monsoon winds and rain are sometimes very strongly marked in North-Western and Central India, and extend over two or three weeks. They are known as breaks in the rains. Fine dry weather with clear or lightly-clouded skies and light unsteady winds are the chief features of these periods. They are frequently terminated by the formation of cyclonic storms in the north of the Bay. These storms are generally comparatively feeble, but are sometimes of considerable intensity. They usually drift west-north-westwards, their tracks being coincident with the belt of low pressure which demarcates the area over which the Bombay current is predominant from that over which the Bengal current extends at the time. As a rule, they do not give rise to strong stormy winds on land, and they are chiefly noteworthy for the heavy and more or less concentrated rainfall they give to the areas over which they advance. They hence frequently carry heavy rain to districts in India, which would otherwise receive very light rain during the monsoon. They are hence a very important feature of the south-west monsoon, as they largely modify and determine the distribution of the monsoon rainfall. The progress of one of these storms is shown in the series of charts in the third plate below. The first of these charts shows the storm as a small closed area in the north-west angle of the Bay. The chart of that day (the 25th July 1891) also indicates that a trough or belt of low pressure stretched from South-West Bengal west-north-westwards through Baghelkhand to Lower Sind. The charts of the 27th and 29th show that the storm progressed west-north-westwards along the trough, and that it was entering Sind on the 29th.

In September the force of the monsoon begins rapidly to decline, and after about the middle of the month it ceases to carry rain to the greater part of North-Western India. In Bengal, as a rule, the rains last a month later, but in the west of the Bay the monsoon begins to recurve in October, and a copious rainfall is discharged on the hitherto scantily-watered plains of the Carnatic. October, too, is above all others the month of severe cyclonic storms in the Bay of Bengal. Less frequent indeed than those formed during the height of the monsoon off the coasts of Bengal and Orissa the circumstances favour their prolonged gestation in the central regions of the Bay. Hence they acquire great force and range over a larger surface, and the storm-wave which so frequently accompanies them sometimes in sweeps as an exterminating flood over the densely-peopled alluvial flats of the Megna, Ganges, or Godavari, multiplying a hundredfold the destructiveness of the storm. The rains of the Carnatic last till December, the seat of their chief prevalence moving gradually southwards to Ceylon with the declining year. In their rear springs up the gentle steady north-east wind which gradually extends over the whole expanse of the Bay and is known as the north-east monsoon. A wind similar in character, but rather more easterly in direction, simultaneously takes possession of the Arabian Sea.

# CHARTS SHEWING NORMAL SEASONAL RAINFALL AND MEAN TEMPERATURE.



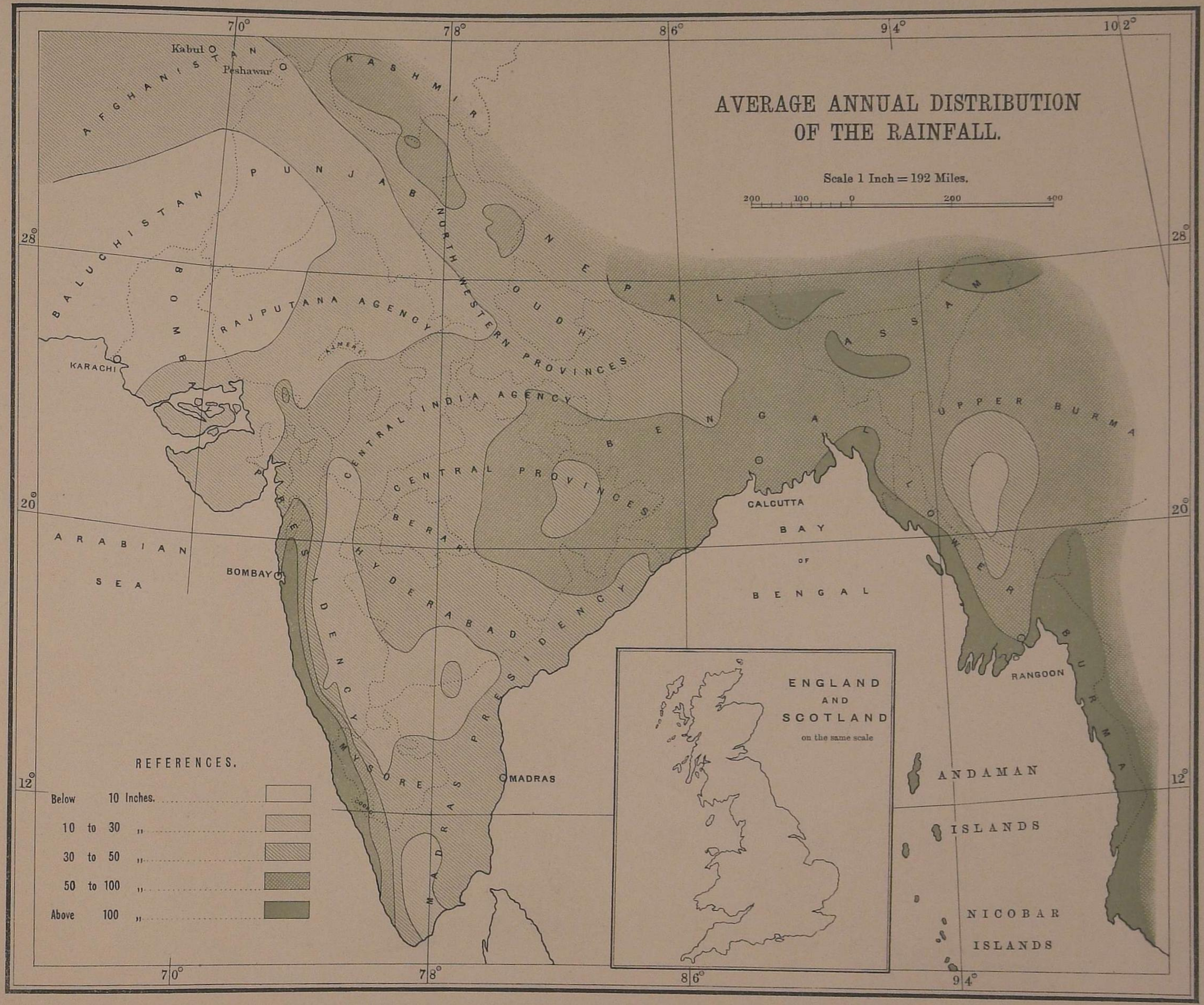

NOTE.—The shadings represent the mean rainfall of each of the eleven districts into which India is usually divided for Meteorological purposes. Hence there appear in some cases sudden transitions in shading from one district to another, which would not appear if the system of isohyetic lines were adopted.

Reg. No. 131, R. & A. Dept.—June 94.—2,010

**RAINFALL EXPLANATION.**

Below ...... 1 Inch ..........
1 to .. 2 Inches ..........
2 to .. 5 ,, ..........
5 to .. 20 ,, ..........
20 to .. 50 ,, ..........
50 to 100 ,, ..........
Above ... 100 ,, ..........

Litho., S. I. O., Calcutta.

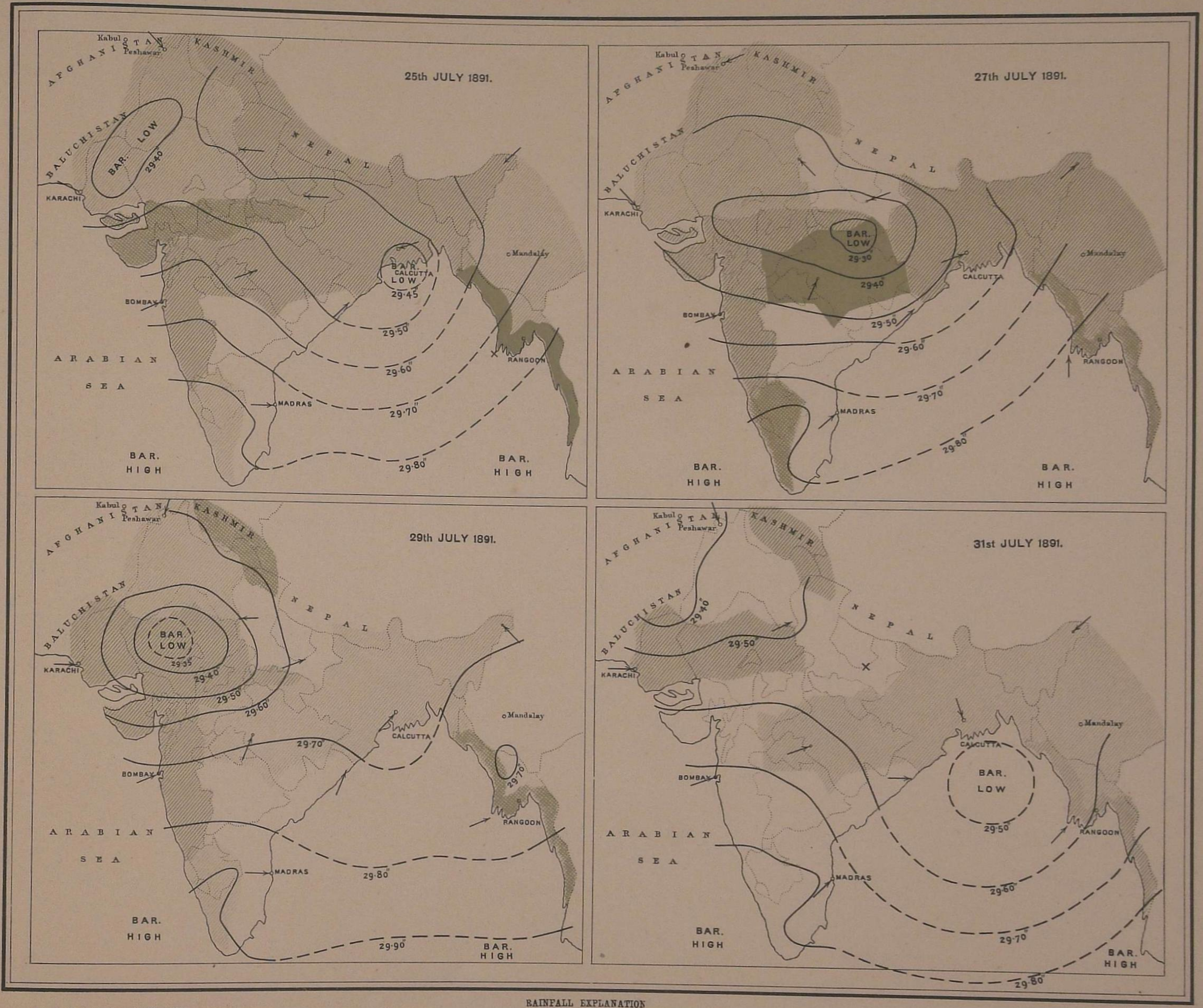



Reg. No 19, R. & A.—Apr. 94.—2,000

NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

Litho., S. I. O., Calcutta.

# CHARTS SHEWING HISTORY OF A SMALL CYCLONIC STORM IN THE RAINY SEASON.




RAINFALL EXPLANATION

Below 0·2 Inch

0·2 to 0·5 ,,

0·5 to 1·0 ,,

1·0 to 2·0 Inches

Above 2·0 ,,

Reg. No. 151. R. & A. Dept.—June 94.—2,016

Litho., S. I. O., Calcutta.

# CHAPTER IV.

# IRRIGATION.

IT is the combined forces of the monsoons, mechanically assisted by the mountain ranges, that provide the agricultural resources of India, and raise it to an importance which the barren wastes of the huge continent to which it hangs cannot reach. It is not only in pouring showers and moisture on the crops of each year that the monsoons create the agricultural resources of India; they also wash down, and have for ages washed down in rivers and floods, the fertile soil on which the crops are grown. They also fill vast underground reservoirs with perpetual seas of fresh water. They supply the mountains with their snows and springs. River after river debouches from the grand Himalayan range, to be lifted one after another by the toil and talent of English engineers, and spread over the thirsty plains; and not only so, but, though it seems somewhat unfair, even the rain-waters which descend to the trans-Himalayan regions refuse to enrich Central Asia, and beating like trapped birds against the bars of a cage, press along the outer base of the mountains, till they reach a friendly opening through which they turn with a sharp and eager bend into the plains of India. Thus the Indus and Brahmaputra, the great rivers of the west and the east, break through into the Punjab and Bengal.

It is necessary to understand clearly how moisture is brought to and confined in India before dealing with its distribution and its application to plant-life. Plant-life cannot exist without moisture, and, as agriculture is the science which deals with the utilisation of plants for human needs, agriculture, especially in tropical regions, depends on the provision of moisture by natural or artificial means. One of the most interesting studies in Indian agriculture is to examine the different forms in which moisture is made serviceable to plant-life by nature or by man.

In dealing with this investigation it is desirable at the outset to make one very important division of the "moisture" which is in India available for plant-life. The division is this: There is (I) the moisture brought by the monsoons of the current year, and (II) the moisture left behind by the monsoons of previous years. These supplies of moisture are distributed in the following forms:—

*I.—The moisture of the current year—*

- (*a*) Rain and atmospheric vapour;
- (*b*) River-floods and inundations;
- (*c*) Shallow tanks and ponds;
- (*d*) Retention of moisture in soil.

*II.—Moisture of previous years—*

- (*e*) Rivers fed by snow and mountain springs;
- (*f*) Underground reservoirs;
- (*g*) Deep lakes or surface reservoirs.

Each of these will be briefly considered in turn.

I. (*a*) Rain and vapour—of which the distribution is clearly indicated in the meteorological maps—are spread in very unequal proportions over India. To some provinces and tracts they are so plentifully supplied by nature that no artificial means of obtaining moisture for the sustenance of plant-life is there necessary. Such tracts are, speaking generally, Burma, Assam, and Eastern Bengal, a narrow strip running under the Himalayas as far as the boundary between the Punjab and North-Western Provinces, and the whole of the country on the African side of the Western Ghâts. It may assist the reader's imagination to be told that outside India, countries of a similar class are Java, Borneo, Ceylon, the Malay Peninsula, and, to go to Europe, the British Isles themselves. In none of these countries is artificial application of moisture required. Not shown in diagram below.

(*b*) River-floods and inundations. Outside India, a typical tract receiving moisture in this form is the delta of the Nile. Inside India such tracts are the deltas of all the large rivers, enormous stretches of country on either side of the rivers in Eastern Bengal and parts of Assam, here and there a tract of country at the foot of the Himalayas, strips of land along the banks of the large rivers which intersect the Gangetic valley, and, everywhere, but especially in the lower part of the Gangetic valley, wide-spreading swamps from which the water of the rains cannot readily escape until removed by evaporation. Not shown in diagram below. In the north of India the distribution of the annual flooding is much assisted by inundation canals,—that is to say, by canals which carry off the high-level water or "spill" when the river is in full flood. Canals of this kind were much used by the natives of India before British occupation. Shown in diagram under 'Canals.'

(*c*) Tanks and ponds. By these terms are meant such shallow hollows and depressions as are only of sufficient depth to hold the supply of one year, and which dry up altogether in the hot season. They are most numerous in clay soils and prevail over the whole of the Gangetic valley as far as Oudh. They are also numerous in some parts of Madras and Bombay. Shown in diagram under 'other sources.'

(*d*) Retention of moisture. An example of a soil which retains moisture is to be found in the "black cotton soil" of Central India. Black soil is derived from trap rock, and possesses the peculiar property of resisting evaporation. In the same class with the black cotton soil may be placed the enormous flats which lie alongside the river-beds of large streams in the sandy plains of the Punjab, and which, though not inundated, hold a supply of moisture sufficient without irrigation for plant-life. Not shown in diagram.

II. (*e*) The first method of storage of the moisture of previous years is provided by nature in the snows of the Himalayas and in the springs of all mountain elevations in India. This supply is distributed by canals taken from rivers that are fed by melting snows and mountain springs. An examination of the Shown in diagram under 'Canals.'

Irrigation Map will indicate roughly the tracts of country which are thus supplied with water, the most prominent being the western end of the sub-Himalayan chain, and the west coast of Madras. In the Punjab system of irrigation, whole rivers of great size are lifted bodily into canals constructed just above the foot of the Himalayas and are spread over the plains in a net work of distributing channels. The Ganges, after being lifted into its canal-bed, is carried first under one river, then through a second and, finally, in a long aqueduct over a third. The width of the canal at this point is 160 feet. The total length of the Ganges Canal, exclusive of distributing channels, is one thousand miles. These figures will convey some notion to the imagination of the magnitude of an Indian canal. The total length, including distributaries, of the various canal systems under the supervision of the Government is over thirty-three thousand miles, or more than twenty times the length of the River Ganges, and the area they irrigate is considerably larger than the total area of Belgium.

Shown in diagram under 'wells.'

(*f*) Underground reservoirs. These constitute the most important form in which the rain of previous monsoons is stored and applied for agricultural purposes. The rain, which falls over the whole of the shaded surface of the meteorological map, soaks into the soil and forms underground seas and reservoirs, from which, if the water surface is not too far below the surface of the land the water is lifted up or baled out by the cultivating population through cylindrical holes or wells, for the irrigation of their crops. The most important of the fresh-water reservoirs thus formed underground is that which underlies the whole of the brown or alluvial tracts (see Geological Map in Chapter II above) from Peshawar to Calcutta, and which is large enough to deserve the name of an underground fresh-water sea. The underground sea of this great alluvial valley is more largely used in the central section than at either extremity, because towards the western or Punjab end the water lies at too great a distance from the surface of the soil to admit of its being lifted without great labour and expense, while towards the eastern or Bengal end rain and moisture are so plentiful as to make irrigation unnecessary. In the central part of the alluvial valley the atmosphere is sufficiently dry to demand irrigation, while the surface of the subsoil sea is so near as to be easily reached. Hence between Delhi and Benares, the upper stratum of the alluvial plain is riddled like a sieve with water-holes or wells from 10 to 50 feet in depth, and the result is that the Irrigation Table shows the "well"-watered area of the North-Western Provinces to be far in excess of that of any other province. Passing to the other parts of India, we find that Madras is the only province in which wells are at all numerous. They occur chiefly in the low-lying tract which in the first map of the Atlas is to be observed in the south-eastern part of the Presidency. Elsewhere subsoil water is generally too far from the surface of the land to admit of wells being made except in those places where a local reservoir of underground water is formed by a hollow depression in hard rock. Such underground reservoirs or lakes often occur in connection with the reservoirs formed naturally or artificially on the surface of the country. The underground reservoir or lake is, as it were, the subsoil shadow or fringe of the surface lake, and wells are consequently not seldom found within a mile or two of an open lake in a country where they are elsewhere wanting.

Shown in diagram under 'other sources.'

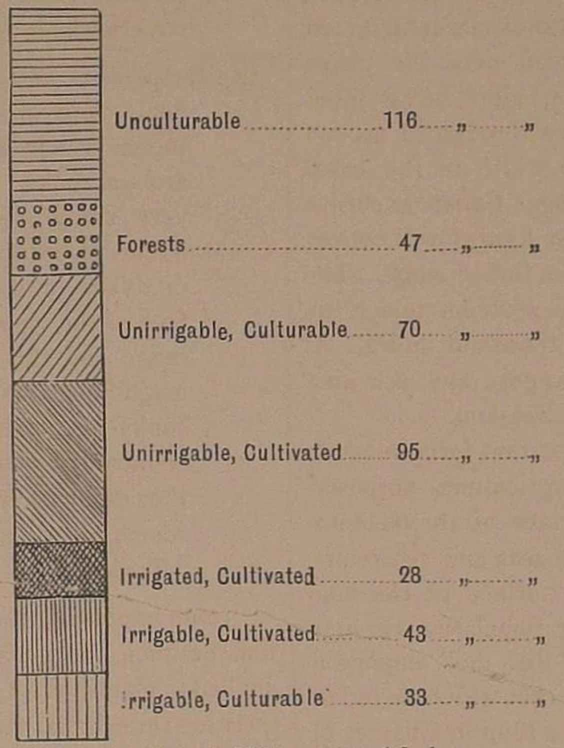
(*g*) Deep lakes or surface reservoirs. These lakes or reservoirs constitute the final class of the list. The most striking and prominent of them are those which are formed in the large valleys and ravines of the hard archæn rocks. In many places they have been formed by nature, but in very many more have been constructed by the Rajput and Muhammadan nobles of former ages, or recently by English engineers, through the agency of dykes or dams of masonry and earth built across the mouths of valleys. One of the most striking features of the whole country between the Aravali range and the north edge of the black soil table-land is the succession of magnificent lake reservoirs which have been thus constructed, and on the banks of which towns and palaces are often built. They appear again in the country lying to the south of the plateau of Central India. In the Madras Presidency they, with their attendant fringe of wells, constitute the main source of irrigation, and are known under the somewhat misleading name of "Tanks."

One interesting fact which is brought out by the above analysis is the connection between the geological formation of India and the form in which moisture is applied to plant-life. A glance at the Geological Map (Chapter II above) will show that there are three broad divisions of prevalent colours, the brown, the green, and the red. The brown tract from Peshawar to Calcutta is a level field, lying, as already explained, over a fresh-water sea. The soil of this field gradually changes from sand in Rajputana and the Punjab to loam in the North-Western Provinces, and to clay and mud in Bengal. It is canal-watered in the west, honey-combed with wells in the centre, and washed in the east by rivers and Nile-like floods of fertilising mud and water. The green tract is neither more nor less than a huge sponge. It contains so large a proportion of rich, black, water-holding soil that it seeks for no other form of moisture supply. The red tract is hard rock covered with fissures, corrugations, and hollows in which surface-waters can be collected with or without the aid of artificial dams.

Erroneous ideas have prevailed as to the extent to which artificial irrigation can be developed owing to disregard of the fact that, there are very large areas which either require no artificial irrigation or are injured by it, and the following diagram which indicates roughly the existing and the possible functions of artificial irrigation in India, will suffice to show the small proportion of the total area to which irrigation can be extended. At the same time, in view of the fact that there are 33 millions of uncultivated acres which can be made culturable, and 43 millions of cultivated acres whose produce can be largely increased, by irrigation, there is large scope for further development: and the Government of the country has still a great duty before it in aiding the cultivating population—either by loans of money or by engineering assistance—to make extended use of the various forms of water and moisture supply available to them.

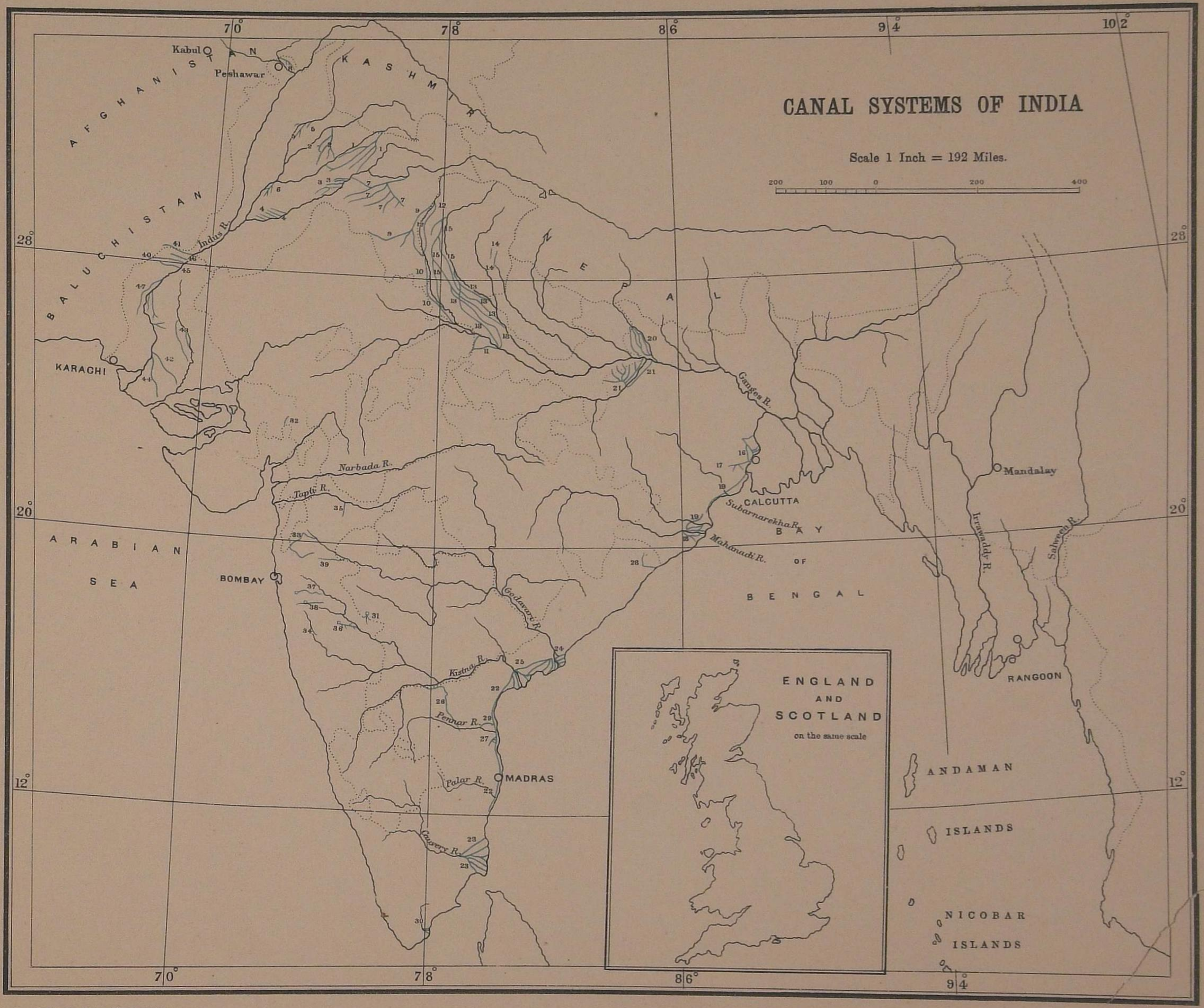
NOTE.—In the Irrigation Diagram below the area given under "Irrigated from other Sources" in Bombay includes a small area (of which the extent is unknown) irrigated by wells. In Bengal and Coorg there is little or no irrigation besides that indicated: and in Assam practically no artificial irrigation at all.

TOTAL AREA OF INDIA 433 Millions of Acres.
(For which returns exist).




*Scale 100 Million Acres=1 Inch.*

*By "unirrigable" land is meant land which does not require irrigation or is injured by it as well as land to which no means exist of providing irrigation.*




**Punjab.**

1. Bari Doab Canal.
2. Chenab Canal.
3. Lower Sohag and Para Canal.
4. Lower Sutlej Canals.
5. Shahpur Inundation Canals.
6. Sidhnai Canal.
7. Sirhind Canal.
8. Swat River Canal.
9. Western Jumna Canal.

**N. W. Provinces.**

10. Agra Canal
11. Betwa Canal.
12. Eastern Jumna Canal.
13. Lower Ganges Canal.
14. Rohilkhand Canals.
15. Upper Ganges Canal.

**Bengal.**

16. Eden Canal.
17. Midnapore Canal.
18. Orissa Canals.
19. Orissa Coast & Hijili Tidal Canal
20. Saran Canals.
21. Sone Canals.

**Madras.**

22. Buckingham Canal.
23. Cauvery Delta System.
24. Godavari do. do.
25. Kistna do. do.
26. Kurnool-Cuddapah Canal.
27. Penner Anicut System.
28. Rushikulya Project.
29. Sangam Anicut System.
30. Srivaikuntam do. do.

**Bombay.**

31. Ekruk Tank.
32. Hathmati Canal.
33. Kadva River Works.
34. Krishna Canal.
35. Lower Panjhra River Works.
36. Mhasva Tank.
37. Mutha Canals.
38. Nira Canals.
39. Pravara River Works.

**Sind.**

40. Begari Canal.
41. Desert Canal.
42. Fuleli Canal.
43. Mithrau Canal.
44. Pinyari Canal.
45. Sukkur Canal.
46. Unharwah Canal.
47. Western Nara Canals.

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Litho. S. I. O.

## TABLE SHEWING IN BLOCKS AND IN ACRES AREAS OF IRRIGATION COMPARED WITH AREAS OF CULTIVATION

| Description of Area | | BRITISH INDIA | BRITISH PROVINCES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bengal | N.W.P.&O. | Bombay & Sindh | Madras | Punjab | C. P. | Burma | Berar | Assam | Coorg | Ajmere |
| Total Cultivated | | 220,000,000 | 53,000,000 | 37,000,000 | 36,500,000 | 29,000,000 | 26,000,000 | 18.000,000 | 10,000,000 | 7,500,000 | 2.500,000 | 157,000 | 413,000 |
| Total Irrigated | | 28,334,000 | 742,000 | 9,975,000 | 3,161,000 | 5,722,000 | 7,348,000 | 686,000 | 552,000 | 43,000 | | 500 | 104.000 |
| Portion Irrigated | from Canals | 10,902,000 | 742,000 | 1,695,000 | 2,193,000 | 2,541,000 | 3,506,000 | | 224,000 | 200 | | 500 | |
| | from Wells | 10,140,000 | * | 5,054.000 | | 1,185,000 | 3,696,000 | 79,000 | 3,500 | 42,000 | | | 82,000 |
| | from Other Sources | 7,292,000 | * | 3,226,000 | 968,000 | 1,996,000 | 146,000 | 607,000 | 324,500 | 1,000 | | | 22,000 |

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NOTE.—Each small square represents 1,000,000 acres.

*Figures not available.

Litho., S. I. O., Calcutta.

# CHAPTER V.

# DROUGHTS AND FAMINES.

THE subject of this chapter, to which the attention of the people of England was first seriously drawn during the so-called Madras Famine of 1878-79, is one which is not properly understood by those who have only a cursory acquaintance with India, or only an intimate knowledge of some parts of it. The fact which it is most necessary to grasp is that occasional famine is only the pronounced expression of continuous scarcity; or in other words, that complete failures of crops in certain parts of India which are so severe as to attract public notice are but as the deep and long-cast shadows of depressions in the agricultural outturn which occur almost every year; that the problem, in fact, of saving a portion of the population from misery and semi-starvation is, over vast areas of India, an annually recurring one. The uncertain character of the rain is so excessive that the agricultural outturn, so far as it depends on the rainfall *of the year*, oscillates violently. English farmers did not, perhaps, know at one time what a violent oscillation of produce meant, and always expected to get twenty-eight to thirty-two bushels of corn an acre, whatever the season might be. They have had more experience lately, but they would be taken aback, perhaps if they were asked to cultivate farms in which it was a mere chance whether the outturn would be nothing, or twenty bushels an acre. How to overcome this oscillation, or to mitigate its effects, is the great problem which has to be solved, and it is being vigorously attacked, and to some extent solved, in India.

In describing the area of uncertain rainfall, we may exclude at once two exceedingly well-marked areas,—*viz.*, the area of constant rainfall, and the area of constant drought. It may at first sight appear singular that the area of constant drought should be as secure against famine as the area of constant rainfall. But a little consideration will show that without the aid of a perfect supply of irrigation or moisture it would be impossible to cultivate that area which never, under any circumstances, gets sufficient rain for the sustenance of plant-life. Hence, so far as cultivated crops are concerned, Sind, Western Rajputana, and the Western Punjab never suffer from failure of cultivated crops, seeing that no single acre is cultivated without a supply of water from a masonry well, a canal, or river-bed moisture. What they do suffer from sometimes is failure of grass for cattle; but as for the moment we are only dealing with field crops, the argument need not be interrupted by this circumstance. Turning now to tracts rendered secure by a constant moisture supply, a glance at the rainfall maps in this atlas (Chapter III above) will quickly show that these are, roughly speaking, Eastern Bengal, Assam, the Central Provinces, and finally the long narrow strip on the Arabian Sea side of the Western Ghâts. Having thus eliminated the secure tracts, it will be easy to pick out the tracts of uncertain rainfall, or, as they may be called, the insecure tracts, which in nine years out of ten get enough rain to tempt a large population to grow crops without irrigation, and in the tenth year or thereabouts are afflicted with a complete drought. Between the extreme misery and starvation under complete drought, in the areas of maximum insecurity and the happy condition of absolute certainty of produce in the tracts of constant moisture or constant irrigation, there occur all degrees of scarcity and all grades of suffering. The map of average annual rainfall is based on the statistics of more than 30 years. The area of uncertain rainfall is very fairly marked by following with the eye or the finger the shaded area of "10 to 30 inches of rain," first from Lahore to Allahabad, then across to Ajmir round by Udaipur to Baroda, and finally through the Bombay Deccan to Mysore.

The districts which lie along the edge of the dark blue in the map, and those which are situated under the lee of the Western Ghâts, and thereby excluded from the influence of any monsoon of unusual weakness, are in the most perilous position.

The next point to be grasped is that when the south-west monsoon is deficieut in force and brings a less amount of vapour over the country than usual, the areas just described are the first to suffer. Sometimes it is one tract, sometimes another, but it seldom happens that in any one year the monsoon winds blow with sufficient force over the whole continent to supply every part of it with the average rainfall. When there is a universal shrinkage, as it may be called, of the whole monsoon, the failure of agriculture is most marked throughout the indicated belt of which the average monsoon rainfall is from 10 to 30 inches.

Owing partly to historical causes, and partly to the fearful struggle that has to be carried on with nature in many parts of India, the Indian cultivators have, as a rule, developed into the most patient, hardworking, and, in many cases, skilful agriculturists that can be found on the face of the earth. Inured to privation, accustomed to maintaining life on short meals, and with scanty clothing, they give their labour for the smallest return it is possible to conceive. The consequence is that, broadly speaking, the agriculture of the country is carried on by a vast human machine—a machine of flesh and blood—which is cheaper in its working than it is possible for any machine of steam and iron to be. In India, we are in a region where the wage-level is so low that the multiplied power of human muscles, or the multiplied power of very weak cattle, supersedes all but machinery of the very lowest order. Wages are rising, and will continue, with civilising influences, to rise still more; but until they do, the question of increasing the products of the country by the application of machinery must be considered a secondary one. The first and primary question is, how far it may be possible for the Government to increase the effective working power of the two flesh and blood machines—the men and their cattle—and thus fulfil a duty which a feeling of humanity, as well as a desire to develop agricultural wealth, impose upon it. The system of agriculture is eminently one of *petite culture*. It will be exaggerating very little to say that the country is split up into so many millions of five-acre farms. The holders of these farms are small tenants paying rent, over a large part of India, direct to the State, and, over a still larger part, to a

landlord, or a landlord intermediate between them and the State. As a rule, the cultivator will do anything that is necessary within the boundaries of his own five acres; it is a delicate matter to meddle with him there. But outside his five acres he can do nothing; and as (with due regard to certain bright exceptions) the intermediate proprietor avoids doing anything, it devolves upon the Government to take whatever measures may be possible and expedient (1) to prevent the deterioration of the working power of the agricultural machine, and (2) to improve its working power. In 1879 England sent a message to India that the people must not be allowed to die of starvation. But the Commissioners, who bore that message, found that much more was necessary than to provide the starving people with food when famine was on them. It was necessary, they found, to secure to them a normal condition of strength and health; and the consequence was that the exhaustive report, written when the labours of the Famine Commissioners were concluded, by their able Secretary (Mr., now Sir Charles, Elliott), suggested administrative reforms of all kinds, which, at first sight, had little to do with the question of famine, but which, on examination, were found to have very much to do with it indeed. For the whole country being built up, as it were, of those five-acre bricks, it is found that all administrative problems, however intricate, can be resolved into factors in which the five-acre unit, and the prosperity of the five-acre holder, is the most important one of all.

The net result of the Famine Commissioner's mission was a further message to India from Her Majesty's Secretary of State, inviting closer inquiry into vital and economic facts, and the adoption of measures tending to increase the produce of the country as well as to cope with famine. The words in which Lord Ripon gave this message to the country show that he considered that to strengthen and improve the condition of the cultivators was the leading measure necessary for the increase of agricultural wealth:—

"It is necessary to point out that the agricultural inquiry should not be confined to the mere collection or collation of statistics in the ordinary acceptation of the term. An examination of the portion of the Famine Commissioners' Report which deals with agricultural inquiry will show that, in recommending with reiterated force an intelligent system of investigation, their final object is to urge through its means, and as a practical outcome of its results, the policy of maintaining agricultural operations at the highest attainable standard of efficiency. The Government of India fully accepts this definition of a most important aim of agricultural inquiry. The maintenance of agricultural operations implies the sustenance of agricultural labour, and the complete provision of agricultural requirements; and in India this means that cultivators, their families, and cattle must be properly fed, and their need for labour, irrigating machinery, and agricultural implements adequately met. Now, insufficiency of food, as well as the deterioration or lack of mechanical appliances, must diminish the effectiveness of labour, and thereby reduce the produce of the country. If, therefore, through rack-renting or any unsuitable system of collecting rent, if from inability to obtain capital on reasonable terms, or if from accidents of season and other causes, the amount of produce becomes less than sufficient to provide the sustenance and appliances required by labour and land, it becomes the imperative duty of Government to ascertain whether any legitimate means can be provided to check the degradation of agriculture which must otherwise ensue. On the other hand, if by any means the efficiency of agricultural operations can be increased, a larger amount of produce will be available both for the support of labour and the provision of mechanical requirements, and also for the rent fund from which the land revenue of the country is derived."

It is in the proper application of these principles that the future increase in the production of the country will be effected, and it is in those terrible battle-fields which have been indicated that their application is chiefly needed, in order to enable the cultivator to make a successful stand against desiccation and uncertainty of out-turn. The directions in which the State, or landlord-in-chief, is taking measures for the maintenance of the full working power, as well as for the increased efficiency of the great muscular machine, may now be briefly indicated. They are these: the promotion of railways; of canal irrigation, and of well irrigation; the reclamation of waste lands, with the establishment of fuel and fodder reserves; the introduction of agricultural improvements; emigration and, finally, the improvement, where necessary, of the revenue and rent systems.

On the whole, the expenditure of capital on railways does, by providing the cultivators of precarious tracts with cheaper food when their harvests are insufficient, afford a quicker benefit to a greater number than irrigation or any other measure Government can undertake, and rightly heads the list.

The next means of aiding the cultivator in his fight against the desiccation caused by the caprices of the monsoon of the year is irrigation by canals and wells,—*i.e.*, by the utilisation of water stored up by monsoons *of previous seasons* in the mountain ranges, and in underground seas. The extent of the protection afforded by wells and canals has increased largely during the last fourteen years, but, as will be seen by a reference to the chapter in this atlas on irrigation (Chapter IV above), there still remains a great deal to be done.

The next means of increasing the produce is by the reclamation of waste land, and the establishment of fuel and fodder reserves. The two are put together, because it is believed that in the area of precarious rainfall it is wiser to utilise many of the waste tracts by converting them into grazing lands than to grow crops on them. The Famine Commissioners estimated that there were more than 100,000,000 of acres of cultivable waste in the British provinces, of which, perhaps, one-half are in the precarious area. But there are in addition several millions of acres now classed as unculturable, much of which it may also be possible to convert into grazing land to avert the terrible losses of cattle experienced in years of drought. A word or two now about the cattle which form so important a part of the machine of 'flesh and blood,' to which reference has been made. Unfortunately, neither railways nor (as a rule) irrigation bring food for cattle. Both railways and water are wanted to sustain the human part of the machine. The main remedy is to establish plantations of fodder trees, and to secure the grazing land from destruction. This measure has been advocated as a means not only of sustaining the cattle power, but by increasing manure, and by supplying fuel to take the place of manure, of adding to the richness of the area already cultivated.

The introduction in India of the more direct methods of agricultural improvement, such as those are understood in Europe or America or Australia, is a subject which has long engaged the attention of the Government, but the vast difference between the conditions of India and those of other countries and the extreme diversities of conditions within India itself have hitherto prevented the commencement of any great measures. The subject was, however, carefully examined in 1891 on behalf of the Government by a European expert, Dr. Augustus Vœlcker, and it is hoped that his report will show the way to the introduction of some important improvements.

Another means of strengthening the cultivation in India is by assisting the population of crowded tracts to emigrate either to less crowded tracts within India or to countries outside where coolie labour is required, and this subject will be dealt with in the chapter on Emigration.

Finally, there is the possibility of relieving them by judicious improvements in the revenue and rent systems. These are described in a subsequent chapter, and it is only necessary to explain in this place that the Government of India, as well as the ruling authorities of those provinces which are most subject to oscillation of outturn, have introduced measures for the prompter relaxation of the Government demand whenever failure of harvest, partial or complete, may render this course necessary for the relief of the agricultural population. A closer return has thus in some degree been made to the old native practice of taking a share of the crop of the year, a practice which, though requiring a very costly machinery and productive of much corruption and harassment to the *raiyat*, is in theory based upon a sound principle.

# CHAPTER VI.

# DISTRIBUTION AND NATURE OF INDIAN AGRICULTURAL CROPS.

THE main object of this Chapter may be said to be to set forth the broad facts of Indian Agriculture. To attempt more would be to obliterate in a multiplicity of details the high lights which it is necessary to paint. And this is not to be wondered at. The explanation lies in the vast extent of the Empire, and in the diversity of the climates and soils of its various provinces. Moreover the information that exists is in many directions incomplete. Large tracts of country are administered by Native Princes who furnish practically no agricultural returns to the Supreme Government, while, even within the British provinces, extensive areas have not as yet been cadastrally surveyed.

*Area of cultivation.*—The British India here more especially dealt with is embraced within an area of 699 million acres, and this has been said to support some 221 millions of people. The portion of that area for which returns were available was in the year 1892 put at 526 million acres, of which 188 million acres were under crops and 32* million acres were current fallows. But in most provinces of India, two crops a year are obtained from fields of recognized superior quality so that by this means an expansion of the area of production, to the extent of say 24 million acres, is normally secured. It may thus be assumed that the total annual crops of British India are drawn from an area of nearly 250 million acres.

*Relation of Crops to climatic conditions.*—The Chapter on "Rainfall and climate" will be found to give full particulars on this subject, and it is only necessary in this place therefore to indicate the co-relation of crops to climatic conditions. Speaking generally, it may be said that the plains of India are divisable into two great crop-sections—*viz.*, a north-western and a south-eastern. These may be separated by a line drawn approximately from Bombay, round the southern extremity of the Central Provinces to the city of Patna in Behar. The former area may be said to be characterised by the production of wheat, barley and linseed and the latter by rice, jute and gingelly. Blending these great areas together and overlapping them to some extent occur the isolated patches normally devoted to cotton, indigo and sugar-cane. But in addition to her plains India possesses a by no means insignificant proportion of mountainous country. She is cut off from the rest of Asia by the lofty Himalayas, and these great mountain systems embrace from east to west some of the most fertile valleys and grassy uplands in the world. So also the plains of the Peninsula are broken into great river basins by highlands and tablelands, and on these extensive temperate or sub-temperate tracts exist. It may thus be recognized that in the changes of her climate, from summer to winter, and in the configuration of her soil, India possesses a diversity of conditions that enables her to produce almost any known crop.

*Crops grown.*—It is not uncommonly stated that the people of India are opposed to change, but on the other hand certain writers would have us believe that it is undesirable that they should change. In relation to existing conditions, the native systems of agriculture are indeed admirable, and need but to be developed to attain a high state of perfection. But there are few aspects of Indian agriculture in which improvement is not only possible, but in which it is not as a matter of fact taking place. Witness, for example, the startling revelation obtained from a study of the present crops of our fields and gardens. Some 50 or 60 of our most generally grown plants came to us, within historic times almost, from other parts of Asia or from Africa and Europe. Of this nature may be mentioned the onion, leek, rape-seed, cabbage, cauliflower, turnip, pomelo, water-melon, coffee, loquat, soy-bean, ochro, lettuce, flax (linseed), litchi, poppy, field-pea, apricot, plum, peach, apple, betel-pepper, chena, and Italian millet, etc., etc. So again within still more recent times America has furnished India with many cultivated plants, such as the aloe, pine-apple, custard-apple, earth-nut, arnotto, capsicum and chillies, papaya, cinchona, pumpkin, sweet-potato, tomato, arrow-root, tobacco, prickly-pear, guava, Cape-gooseberry, potato, Indian-corn, etc., etc. Turning from our fields and orchards to the avenues and hedgerows, to the jungles and even forests, we find an equally high percentage of exotics. Indeed, it might be almost said that from Calcutta to Lahore 50 per cent. of the *prevalent* cultivated and wild vegetation has been imported by India within historic times. Were we, therefore, to eliminate the plants named, together with the systems of agriculture and horticulture necessitated by these, how much would remain that could be called ancient? And these facts indicate the possibilities of the future for, as already stated, there are few crops grown in any part of the world that could not be produced in this country.

*Classification of Products.*—The agricultural products of India may be grouped as follows:—

(*a*) FOOD CROPS (wheat, rice, barley, millets, pulses, sugar, spices, etc.)
(*b*) OIL-SEEDS (linseed, rape and mustard, castor, sesamum, ground-nut, etc.)
(*c*) FIBRES (cotton, jute, hemp, rhea, silk, wool, etc.)
(*d*) DYEING AND TANNING MATERIALS (indigo, safflower, *Al*, etc.)
(*e*) DRUGS AND NARCOTICS, ETC. (opium, tea, coffee, tobacco, cinchona, Indian-hemp, vines and other sources of alcohol, etc.)
(*f*) MISCELLANEOUS PRODUCTS (cutch, lac, wild silk worms, India-rubber, palm-sugar, cocoanut [fibre and oil], myrobalans, musk, etc.)

The articles indicated under the section (*f*) above can hardly be regarded as agricultural crops, but it is intended to draw attention in these products to a somewhat significant feature of India as compared with the Europe of the present day,—namely, a source of wealth derived from wild or semi-wild animals and plants. The cocoanut palm cannot, strictly speaking, be treated as an agricultural

* Bengal not having been cadastrally surveyed it is probable that some 5 millions might be added to this figure without much danger of overstating the actual cultivated area of British India.

crop, though it is regularly planted, and large tracts of country are devoted to it. So in the same way, the date and palmyra palms are sources of wealth to many parts of India. The *mahua* tree may be spoken of as one of the most valuable cultivated or semi-cultivated plants of large tracts of country, affording, as it does, food, oil, and alcohol. The *singhara* or water-chestnut (like the water-cress of Europe) is of considerable importance to wide areas of India. On the lower hills and scrubby forest-lands, the collection of such articles as lac, wild silkworms, cutch, India-rubber, gums, dyeing and tanning materials, medicinal products, paper-making grasses, etc., etc., affords by no means an insignificant contribution to the resources of the people who inhabit such regions. It may in fact be said that in few countries of the world do wild products assume such importance as in India. Not only do the poor eke out their daily subsistence by wild food-stuffs, but in times of scarcity and famine vast communities have been enabled to tide over the ruin that has overtaken them, through their knowledge of the wild products of their country.

## CHIEF CROPS.

FOOD CROPS—*Millets and Pulses.*—Sheet No. 2 below exhibits by percentages to total cultivation, the areas devoted to four of the more important of the so-called universal crops, *viz.*, of the *millets*, jowar and bajra and of the *oil-seeds*, linseed and gingelly. A glance at the miniature maps of India below, will suffice to show the wide distribution of these four crops. And it may be said that the blank patches would be very largely filled up were the other millets and oil-seeds shown, as also the pulses, and that there are large areas, mainly in Native States, for which no returns are available. But for the purpose of more clearly manifesting the distribution of the special crops, the millets and pulses and also the oil-seeds (the universal crops) may for the present be eliminated from consideration.

*Cereals.*—The great Indo-Gangetic basin may be spoken of as extending from Calcutta to Peshawar. This possesses at its two extremities vast areas of cereal cultivation. At the north-western end which corresponds to the Panjab and some districts of the North-West Provinces, wheat and barley predominate, and at the south-eastern—the province of Bengal—rice holds almost exclusive sway. Between these two extremes, say from Delhi to Patna, a mixture of the two types of cereal crops prevails, but with a stronger tendency to the Panjab crops than to those of Bengal. Sheet No. 1 shows this extensive alluvial area with wheat and barley deepening in the shades of increasing percentages northwards, and with those of rice southwards. The rice map is peculiarly striking, showing, as it does, the swamp loving cereal engaging more and more of the soil to the south and east until it envelopes the whole of Burma on the one hand, and on the other sweeps round the shores of India in the regions of high rainfall.

It will be observed, however, that the wheat map displays an area of cultivation of that crop in the more central tracts of the continent. This may be said to correspond to the Native States of Central India, to the Central Provinces, and to portions of Northern Bombay. This is the "red wheat" field of India. Unlike the Panjab (which may be called the "white wheat" area) this tract neither depends on winter rains, nor on canal irrigation. It has a rich spongy soil, which retains the autumn moisture, and owes some share of its temperate climate to its altitude. This is known as the "black cotton soil" area, a fertile region for which the cultivator has the choice of crops in cotton, wheat, and linseed. In no other part of India can it be said that these three crops dispute possession of the soil in so marked a degree or admit of so ready an interchange from year to year as the prospects of the foreign markets vary.

South-west of the mid India plateau, broken ground and wild jungle prevail, from Chutia-Nagpur in the east through Orissa and along the north of Hyderabad State almost to the town of Bombay. Below this line wheat disappears, and the moist tropical vegetation of the peninsula once more dominates. On the low lands of this marine-influenced tract rice and cocoanuts are grown, and on the higher lands coffee and spices. Cotton gradually diminishes as the black soil gives place to the harder rocks and the white rice soils.

*Food Production.*—From the classification of food crops given above, it will be seen that India produces wheat, rice, barley, millets, (including Indian corn), pulses and lentils, sugar-cane and spices; but, in addition, a very extensive series of root-crops, vegetables, fruits and wild edible products are annually obtained. Space cannot be afforded to deal with these in detail, but it may be stated that for the year ending 31st March 1892, the acreages in the margin below were returned as under food crops:—

| | | |
|---|---|---|
| 1. Rice | 63,529,117 | |
| 2. Wheat | 20,180,857 | |
| 3. Barley | 3,474,874 | } * 12,042 000. (items 3–9) |
| 4. Cholum or Jowar (millet) | 20,130,762 | |
| 5. Cumbu or Bajra (millet) | 10,361,948 | |
| 6. Ragi or Mandua | 3,051,792 | |
| 7. Maize | 3,156,842 | |
| 8. Gram (Pulse) | 8,067,842 | |
| 9. Other food-grains, including pulses | 28,204,845 | |
| 10. Condiments and Spices | 652,448 | |
| 11. Sugarcane | 3,100,147 | |
| 12. Other Sugar-yielding plants | 14,634 | |
| 13. Orchards and Garden produce | 1,776,705 | |
| 14. Miscellaneous Food crops | 3,049,150 | |
| 15. GRAND TOTAL | 180,784,563 | |

* Area not distributed under the crops bracketed.

Nos. 1, 2 and 3 may be designated the chief cereals; 4, 5, 6 and 7 the millets; and 8 and 9 the pulses. It will thus be seen that during the year in question, of the surveyed area of India 88 million acres were devoted to rice, wheat and barley and 73 million acres to millets and pulses. If now it be recollected that the foreign exports of food materials are mainly rice and wheat, it will be realized that to the people of India the millets and pulses collectively are more important articles of food than any one, if not than all collectively, of the staple cereals. The average yield of food crops has been estimated to be somewhere near 12 bushles an acre. If therefore that figure be accepted, the outturn for the year in question must have been 57,200,000 tons—a quantity, even after allowing all deductions for foreign exports, quite sufficient to support the community of the surveyed area. But no such calculation can be seriously considered, since it ignores (even if correct so far as it goes) many factors of vital importance, such as animal food materials, especially fish, and the wild food-stuffs.

NON-FOOD CROPS.—These practically correspond to the four groups (*b* to *e*) given above, namely, Oil-seeds, Fibres, Dyeing and tanning materials, and Drugs and narcotics.

The following statement may be given of the areas which in 1892 were under these Non-food crops :—

| | | Acres. |
|---|---|---|
| Oil-seeds. | 1. Linseed | 2,686,336 |
| | 2. Til or Gingelly | 2,132,117 |
| | 3. Others | 3,678,170 |
| | | * 4,360,800 |
| | TOTAL | 12,857,423 |
| Fibres. | 4. Cotton | 9,063,705 |
| | 5. Jute | 1,758,144 |
| | 6. Others | † 437,753 |
| | TOTAL | 11,259,602 |
| Dyes. | 7. Indigo | 1,093,808 |
| | 8. Others | 34,425 |
| | 9. Indigo and others | * 62,000 |
| | TOTAL | 1,190,233 |
| Drugs and Narcotics. | 10. Opium | 578,604 |
| | 11. Coffee | 127,648 |
| | 12. Tea | 884,219 |
| | 13. Tobacco | 474,519 |
| | 14. Cinchona | 13,862 |
| | 15. Indian Hemp ‡ | 8,808‡ |
| | 16. Others | 63,094 |
| | TOTAL | 2,150,754 |
| Non-food crops not specified | | 933,191 |
| | GRAND TOTAL | 28,391,203 |

* Acreages not distributed.
† This includes certain areas of both cotton and jute.
‡ A large proportion of this area may be hemp fibre.

When compared with the very much larger area devoted to the Food crops, that under Non-food crops appears remarkably small—28¼ million as against 181 million acres. But small though by comparison it undoubtedly is the area here dealt with yielded by far the major portion of the foreign exports of the country during the year in question. Space cannot be afforded to allow of each article in the above table being dealt with separately, but in the same brief way in which the maps of wheat, barley, jowar and bajra have been alluded to those showing linseed, gingelly, cotton, jute, indigo, tea and coffee may now be discussed.

(*b*) OIL SEEDS—*Linseed and Gingelly.*—Sheet No. 2 below shows the percentage of cultivation of linseed and of gingelly worked out upon the total cultivation of each district. It will be seen that while (as already remarked) linseed attains its highest cultivation in the central tableland of India, in close approximation to the area of red wheat and cotton, gingelly is much more widely distributed and shows its strongest tendencies for the hot moist rice areas. Of the total linseed area the Central Provinces alone possess normally fully one half the crop, the balance being dispersed mainly through the North-West Provinces, Oudh and Behar, on the one hand, and through the Berars and Bombay on the other. With gingelly it is quite different. Madras may be said to have the highest area, and to be followed by Bombay (Gujarat) and Sind, the Central Provinces, Bengal, and Burma. Castor and gingelly are the chief oils of the warm moist regions, and linseed, rape and mustard those of the drier and colder tracts. But through long cultivation an extensive series of races of most of the oil-seeds have been produced, so that there are not only summer and winter forms of gingelly, for example, but even forms that grow on the hills up to altitudes of 7,000 feet.

(*c*) FIBRES—*Cotton.*—Sheet No. 1 below gives a map of India to show the percentages of cotton to the total cultivated areas. It is unfortunate, however, that actual returns of the cultivation in Kathiawar (one of the most important cotton areas of India) have not been procured. It seems probable that the Native States of that country have from 30 to 40 per cent. of their cultivated area under cotton, and it is necessary to add that these together with Guzarat yield the finest long staple cottons of India.

In British India (exclusive of Native States) there were, in 1892, 9,063,705 acres under cotton, or say half the area devoted to wheat. An effort was made by the writer to calculate the probable total acreage of cotton in the year ending 31st March 1889. It was then found that there were close on 14 million acres devoted to it, of which a little over 5 million acres were in the Bombay Presidency (including its Native States) ;—in other words, that the Native States of Bombay possessed a cotton area of a like magnitude to that of the British possessions in the Presidency. Bombay (excluding its Native States) possesses a little over 2½ million acres, and Berar has usually a little under that area. It will thus be seen that Bombay and its Native States together with Berar embrace considerably over one half the Indian cotton area. But to this estimate must also be added the acreage of the crop in the Nizam's Dominions—fully one million acres ; so that Western India is then found to have very nearly two-thirds of the total cotton area of all India. This may, therefore, be characterised as the great cotton-producing region as its most characteristic soil is often spoken of as the "black cotton soil." But fringing this great cotton area, and next in importance, are Rajputana, Central India, the Central Provinces and Madras ; and these Provinces and States possess fairly extensive tracts of country under the crop, as they have soils that are in many instances transitionary from the black cotton to the alluvial soil of the plains of the Indo-Gangetic basin,—the third cotton area of India,—*viz.*, the Punjab, the North-West Provinces and Oudh, Bengal and Assam. Each of these three great sections of the Indian cotton area may be said, roughly speaking, to possess its own characteristic group of cottons, and these three groups, while widely dissimilar from each other collectively, manifest the very greatest range in quality, strength, length of staple, and yield. Indeed, it may be said of the cottons of any one Province of India that the most remarkable local variations occur ; certain commercially distinct (though perhaps in some cases botanically identical) forms are often met with within the most arbitrarily isolated tracts of country. The cottons of India may be further referred approximately to two great sections—the early and the late crops. The former comes into market from October to March, the major portion from October to January. The latter does not commence to come into market much before February, and is, as a rule, over by April, though exceptional crops are not ripe before June. The early crops are represented by the "Bengals" (such as the cottons of the Panjab, the North-West Provinces, Oudh, and Bengal), the "Oomras" (the chief cottons of Berar, Khandesh, etc.), the "Hinganghats" (of the Central Provinces, etc.), and many of the Sind cottons. The late crops are represented by the "Dholeras" (important crops of Kathiawar, Kutch, and Guzerat), by the "Broach and Surats," by the "Coomptas" (indigenous cottons of Dharwar, Bijapur, Belgaum, etc.), and by the "Coconadas" and "Tinnevellys." This purposely leaves out of consideration the American cottons,* such as "the saw-ginned Dharwars," "Verawals," "Salems," and "Coimbatores," which are also, however, all late crops. While we have thus a comparatively easy classification according to season, this is at once revealed as more or less the expression of meteorological conditions, since within almost any one of the regions

* Many writers seem to confuse the indigenous long-staple cottons of India with the Americans and speak of them accordingly as difficult of cultivation or only cultivated under coercion. The late crop is mostly long-stapled.

of these crops widely different forms are separately classed in the trade, under the names of the districts where produced. These when examined botanically are often found to be afforded by distinct races, varieties or species.

*Jute*.—Sheet No. 3 gives a miniature map of India to show the jute area. This so forcibly displays the chief characteristic of the crop that it is hardly necessary to offer any special remarks. It seems probable that were definite returns available, the area of cultivation might be found to extend into the lower portions of Assam, where the fibre is known to be produced and regularly exported. But jute is essentially a crop of the swampy tracts of Bengal. Efforts have been unsuccessfully made to introduce its cultivation into Bombay and Madras, but there seems little hope that it will ever become acclimatised to any other areas of India than those in which it exists, nor indeed does any other part of the world seem ever likely to contest the market with Bengal for this cheap fibre.

(*d*) DYEING MATERIALS—*Indigo*.—Sheet No. 3 below gives a map of India to show the areas of the cultivation of this valuable dye plant. It may be said that some doubt exists as to whether the Indigo plant at present cultivated in this country is in reality indigenous. Further, the industry would appear to have originated on the western side of India (Guzerat and Sind being its true home), a region which possesses next to no indigo cultivation at the present day. Owing to the adulteration practised by the natives of India, the industry migrated from this country to the West Indies and America, and in the hands of the colonists the art of manufacturing the dye was matured into its present form. But the troubles that arose between the French, Spanish, Portuguese and English Colonists induced the East India Company to make an effort to restore to India its lost industry, and on its return it was established on the eastern instead of the western side of the country. Whether the plant then brought to India was the original stock or some West Indian or African plant that had been found of higher merit cannot now be definitely ascertained. This much can be said, the plant grown for the most part in South India is an undoubted American species, quite distinct from the Indigo plant of Eastern Bengal and Tirhut. One other circumstance may be here mentioned that has a bearing very possibly on the question of the source of the Bengal plant. It is found that in the regions where the best crops of dye yielding leaves are obtained it does not ripen seed freely. This has led to the institution of the system of growing indigo in the North-West Provinces in order to meet the demands of the Bengal planters for seed.

As will be seen from the map there is a limited cultivation of indigo throughout the warm moist regions, but it is in Eastern Bengal and Tirhut that it attains its greatest proportions.

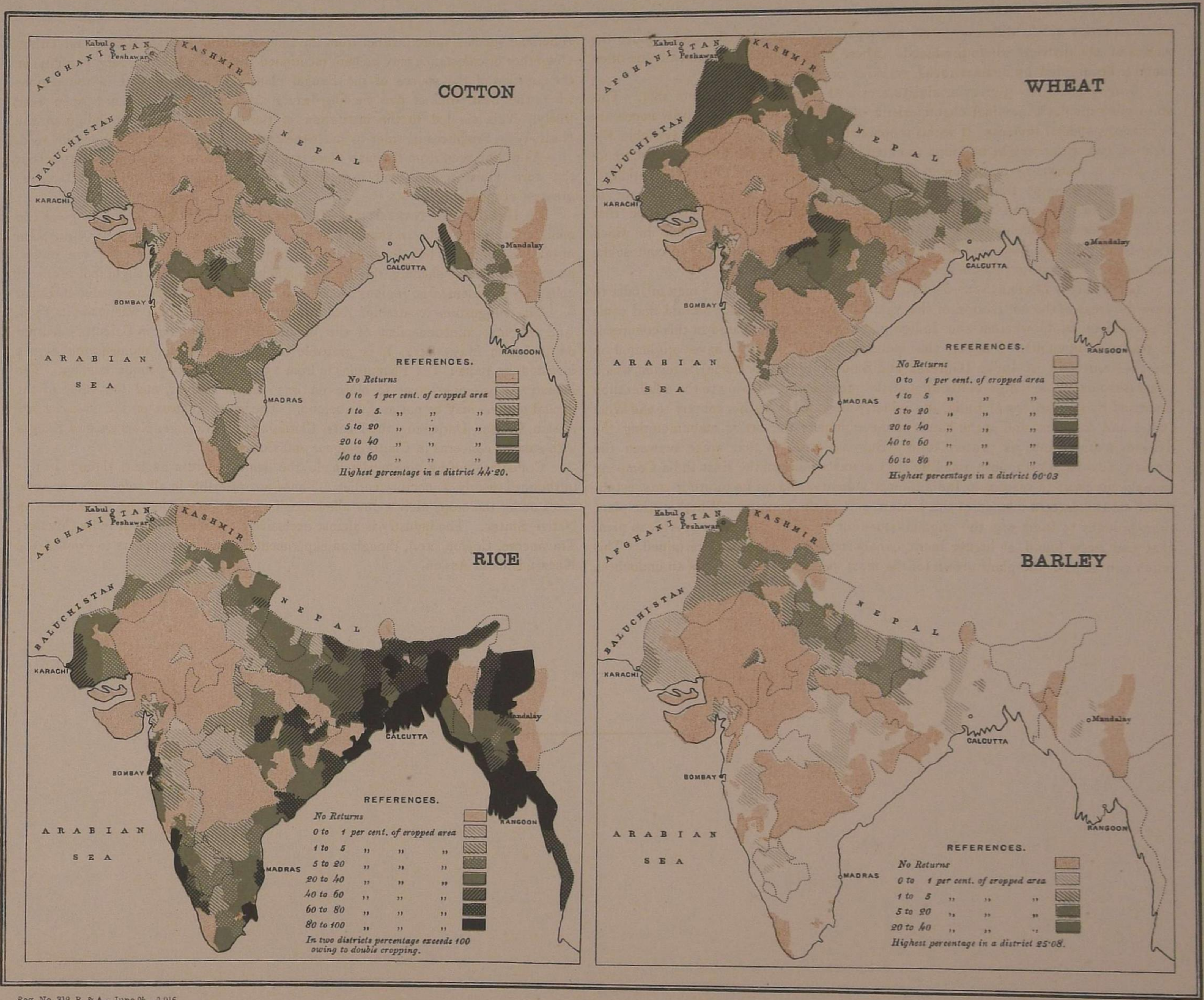
(*e*) DRUGS AND NARCOTICS—*Tea and Coffee*.—Sheet No. 3 below gives two miniature maps of India to show the comparatively restricted areas of the cultivation of tea and coffee. They do so graphically since with the exception of one or two patches of darker shading the maps are blank. And yet these slight indications of colouring represent large regions and denote industries of the greatest value to India.

The suggestion to attempt the cultivation of tea in India was made in 1788, and the first announcement of the public sale of Indian tea in Calcutta occurred on the 26th May 1841. It is probable that at the present moment the money invested in Indian Tea Plantations is from 15 to 20 million pounds sterling. The industry gives employment to close on one million natives, and the value of the annual exports may be put at £6,000,000. The chief centres of the industry are Assam, Cachar, Darjeeling, the Duars, Chittagong, Travancore, Kumaon and Kangra with smaller concerns in Chutia-Nagpur and Burma.

Coffee has not by any means made the same progress as tea, though it was introduced nearly a century earlier. There are probably in all only some 200,000 acres under the crop, after a due allowance has been made for the plantations in Native States. The industry is almost exclusively confined to South India (Mysore, Travancore, Cochin, etc.), though an experimental cultivation appears to exist in the Khasia Hills in Assam.

# CROPS.

SHEET 1.

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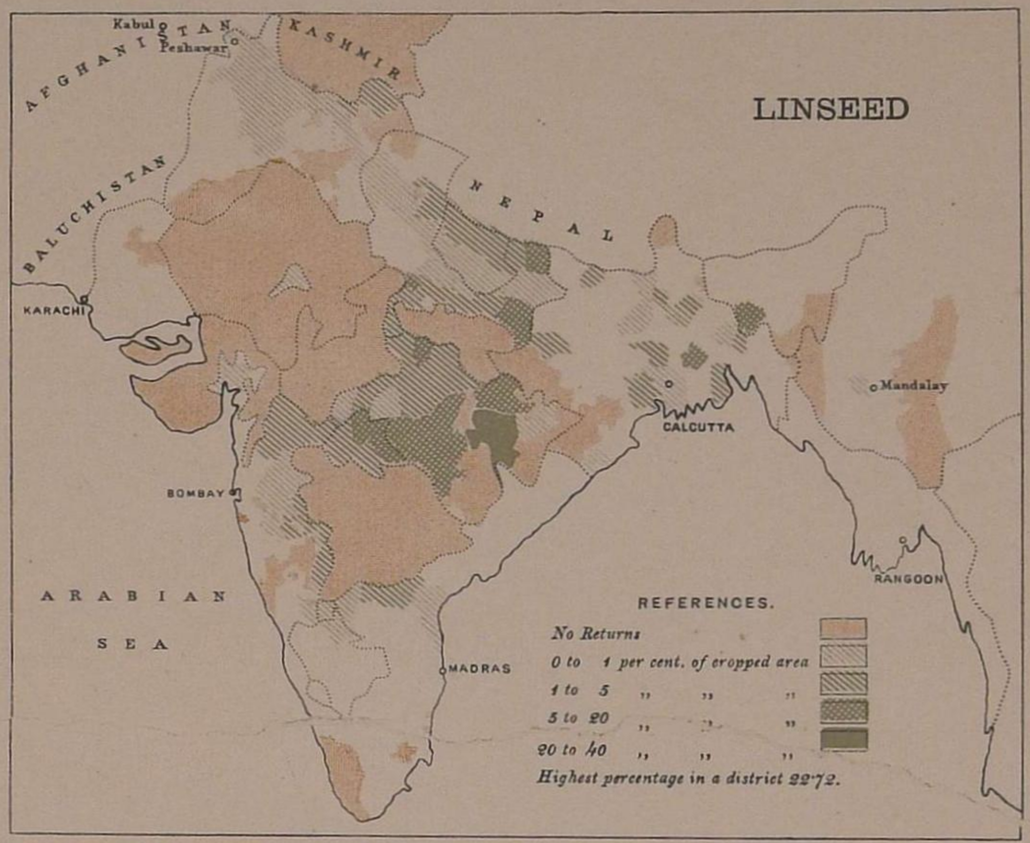
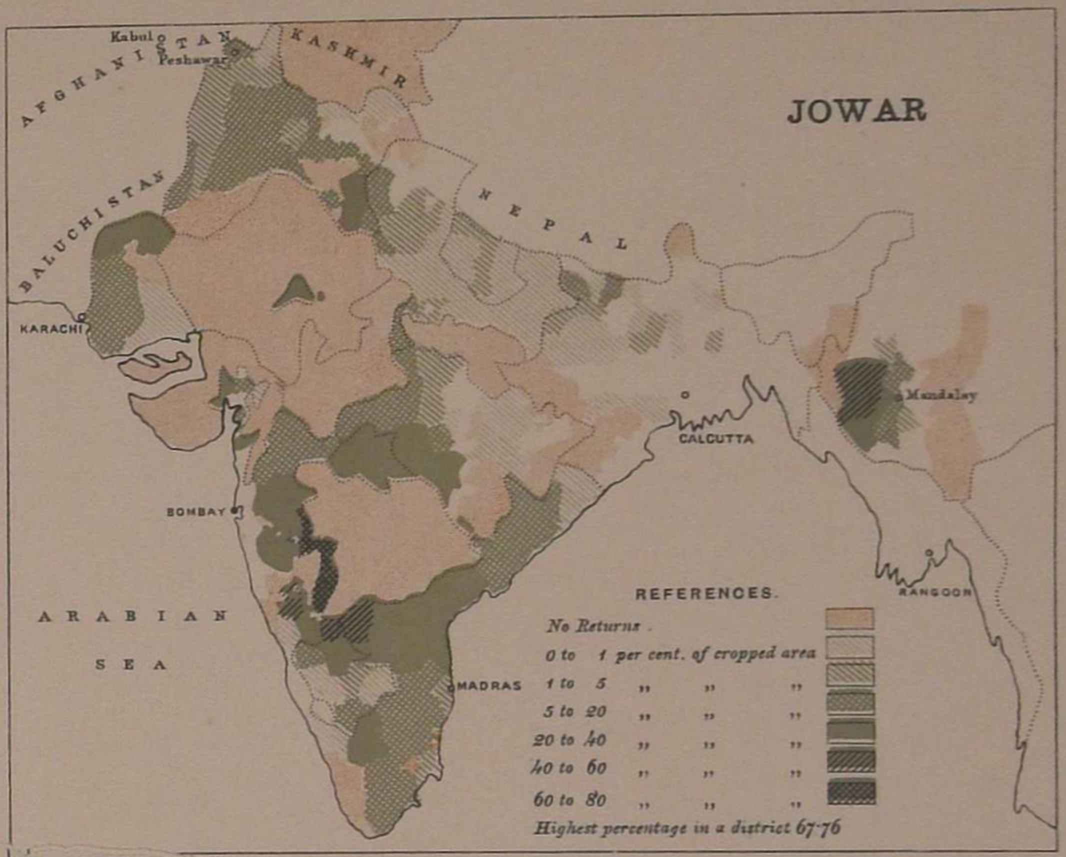
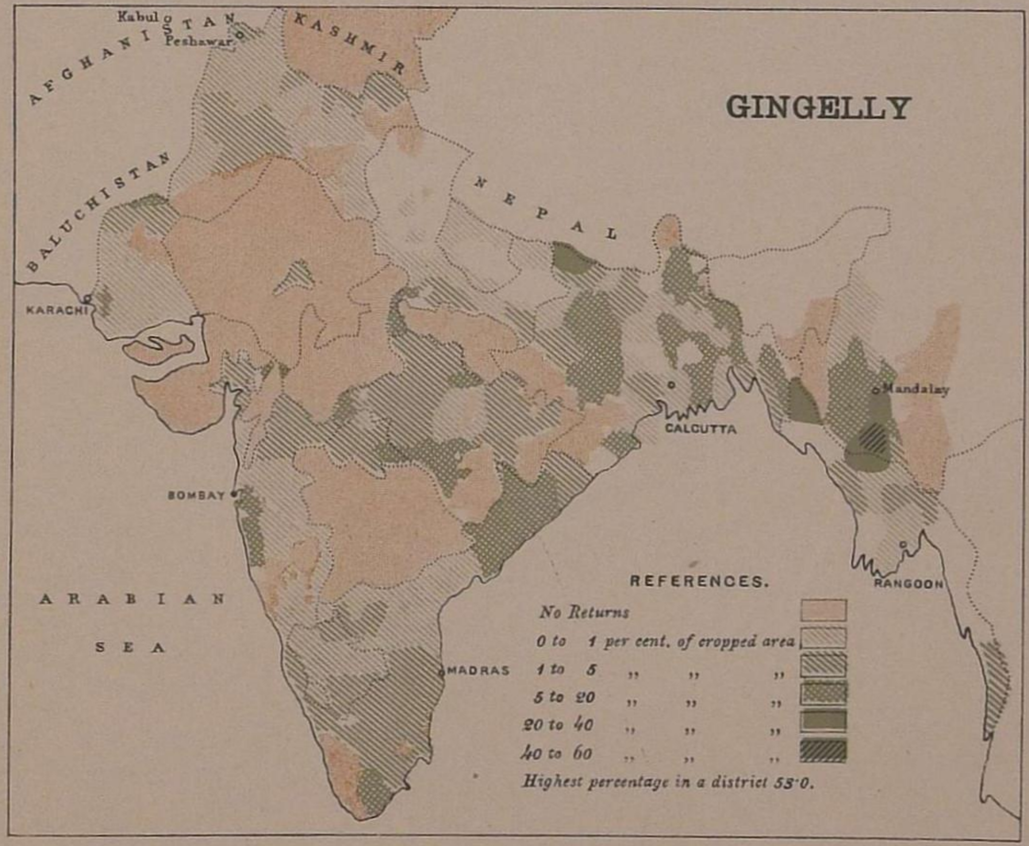
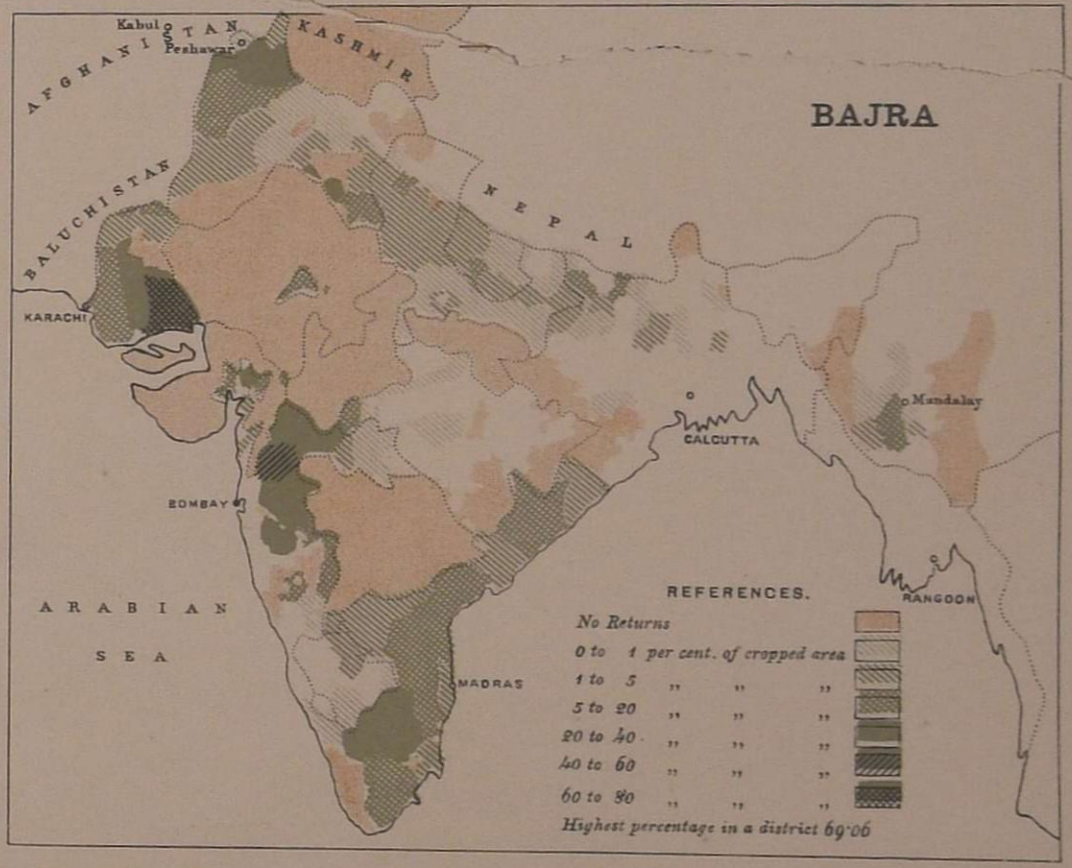
# CROPS.



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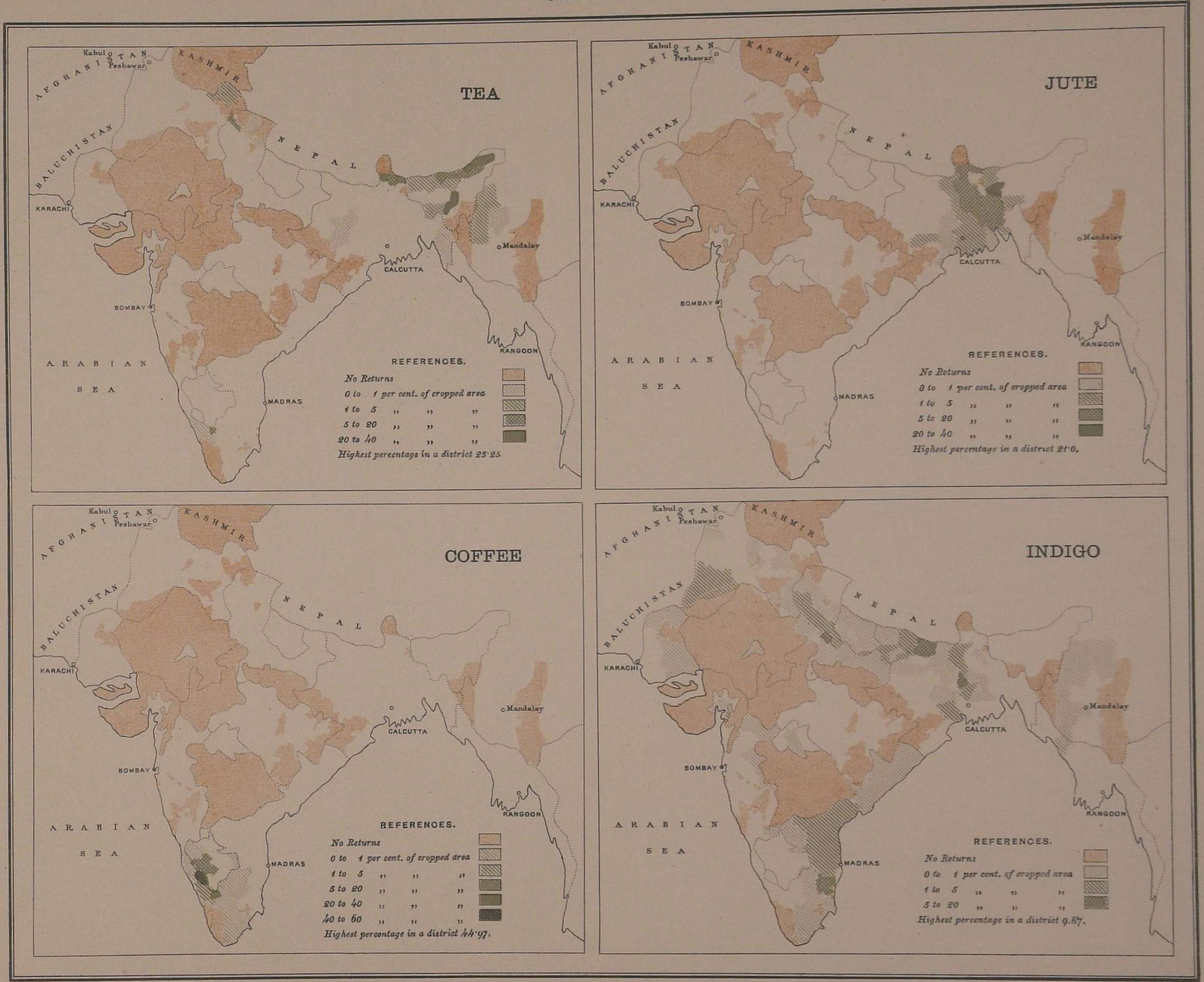


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CHAPTER VII.

# FOREST CONSERVANCY IN INDIA.

FORESTRY in India is a comparatively modern institution.

India is not, like Europe, a forest-growing country throughout. Its position in a tropical and sub-tropical climate prevents this, and lands which, with a lesser evaporation, such as takes place in temperate and cold zones, would be clad with dense forest growth, are here arid and may even be desert. Thanks, however, to the barrier which in the form of the Himálaya separates the north of India from the rest of the Asian continent, and in consequence of the pronounced peninsular formation of the Empire, the greater part of the country is suitable for the natural growth of forests. India is a country of extremes, and contains, on the one hand, evergreen forests of a luxuriance and density such as the imagination can hardly picture, and, on the other hand, deserts. The distribution and character of the Indian forests is due, in the first instance, to the more or less plentiful supply of rain, and next to elevation. The distribution of the rains in India within distinct periods of time is as marked and accentuated as anywhere in the tropics, and, thanks again to the formation of the country, the monsoons extend far north of the Tropic of Cancer. There are two monsoons, the more important being the summer or south-west. Within the direct influence of the full force of the monsoon rains, the country is covered with evergreen forests. Where the rainfall is less copious, the tree crops change into deciduous forests, gradually blending, with still decreasing rainfall, into dry forests and ending in unproductive deserts.

The evergreen forests, created by the influence of the south-west monsoon, occupy the west coast of the peninsula, up to the ridge of the mountain chain separating the moisture-yielding sea from the rest of the continent. In the same way they are spread over the coast districts of Burma and Chittagong, and along the foot on the lower slopes of the Eastern Himálayas. These forests contain trees of many families, among which are specially noticeable the *Dipterocarpeæ*, *Guttiferæ*, *Anonaceæ*, *Meliaceæ*, *Burseraceæ*, *Sapotaceæ*, *Euphorbiaceæ*, *Urticaceæ* and the palms. Few, if any, of the trees are gregarious, but numbers of them yield timbers of great value. Among these are the species of *Dipterocarpus*, *Hopea*, *Mesua*, *Calophyllum*, *Chickrassia*, *Cedrela*, *Isonandra*, *Bischoffia* and *Artocarpus*; while the Teak, Blackwood (or Rosewood, *Dalbergia latifolia*), Ironwood, and other well-known timbers are found in places usually associated with various species of large bamboos. The evergreen forests, due to the winter or north-east monsoon, occupy the Carnatic. They differ considerably in character from those of the south-west monsoon regions and may be said to be 'dry,' while the latter are wet. They contain also a number of species of comparatively small size and hard texture, belonging to such families as *Ebenaceæ*, *Sapotaceæ*, *Capparideæ*, *Rhamneæ* and *Myrtaceæ*; and prominent among them are the Ebony (*Diospyras Ebenum*) and the two species of *Miomusops* with the Jamau, Neem and Tamarind. The deciduous forests, which occupy the larger part of the peninsula and Burma and a considerable portion of the Andamans, are of the greatest importance for the forester, the consumer and the State. This type of forest, the most common in India, contains the chief of the teak areas, the gregarious forests of Sál (*Shorea robusta*), the forests of Red Sanders (*Pterocarpus santalinus*) of the South Deccan Hills, the Sandalwood (*Santalum album*) tracts of Mysore, Coimbatore and the adjoining country, and a number of more or less sporadic kinds, prominent among which are the Anjan (*Hardwickia binata*), the hardest and heaviest of Indian woods; *Terminalia*, *Lagerströmia*, *Anogeissus*, *Soymida*, the satinwood (*Chloroxylon*), *Swietenia*, *Diospyros*, *Acacia*, *Albizzia*, *Pterocarpus Marsupium* and many others: also the Padauk (*Pterocarpus indicus*), which is found in considerable quantities and of large dimensions in the Andaman Islands. This tree has, of all Indian timbers, except Teak, probably the most promising immediate future. It yields the best wood for ordnance purposes and carriage-building, and is sure to rival Mahogany for cabinet-work. The timber is stronger than Teak in every direction, lasts longer, is much handsomer, does not warp in seasoning, and only weighs 15 to 20 lb more per cubic foot. The chief timber-yielding families represented in this region are *Leguminosæ*, *Combretaceæ*, *Myrtaceæ*, *Lythrarieæ*, *Rubiaceæ*, *Meliaceæ*, *Ebenaceæ*, *Bignoniaceæ* and *Verbenaceæ*.

The dry forests are situated in Rajputana and the Punjab, and spread over a large extent of Native States. Towards the north and north-west they become richer and gradually blend into deciduous or alpine forests, whereas they get drier and drier towards the west and south-west, and disappear into the deserts on both sides of the lower Indus, where the courses of perennial rivers alone are fringed by a belt of arboreous vegetation. The chief families represented in this region are those of *Leguminosæ*, *Capparideæ*, *Salvadoraceæ*, *Tamariscineæ*, *Rhamneæ*, *Salicineæ*; and the most characteristic trees are the Jhand (*Prosopis spicigera*), the various species of *Tamarix*, *Salvadora* and *Capparis*.

Hill forests are found within the Indian Empire along the whole of the Himálaya mountain chain from Assam to Hazara, in the mountains of south Afghanistan and Baluchistan, and on the higher mountain ranges in Burma. The prominent families represented in the Himálaya forests are *Coniferæ*, *Cupuliferæ*, *Sapindaceæ*, *Laurineæ*, *Magnoliaceæ*, *Salicineæ*, *Urticeæ*. The most important trees are the Deodar (*Cedrus Deodara*), the Pines (*Pinus longifolia* and *excelsa*), the Firs (*Abies Smithiana* and *Webbiana*), the Oaks (*Quercus incana*, *dilatata*, *semecarpifolia*, *lamellosa* and *pachyphylla*), the chestnut, walnut, maple, elm, ash, birch, poplar and rhododendron.

The tidal or littoral forests are situated along the greater part of the coast of India and in the deltas of its rivers. The prominent families of these forests are

*Rhizophoreæ, Meliaceæ, Lythreæ, Euphorbiaceæ, Sterculiaceæ* and the chief timbers the Sundri (*Heritiera Fomes*), *Carapa*, *Avicennia* and the mangroves.

The annexed maps illustrate these remarks. The first shows the distribution of the chief classes of forests which have been mentioned above. The second indicates the distribution of the principal trees which yield valuable timber or other products, *viz.*, Teak, Sál, Deodar timbers; Caoutchouc and Cutch, extracts used in the arts and manufactures; Sandal and Red Sanders, woods of scent and ornament, the latter also a dye.

For many centuries the Indian forests have suffered from maltreatment of all kinds. British rule, instead of putting an immediate stop to further devastation, gave in the beginning a new impetus to destruction. The watchword of the day was to increase the area of cultivation at the cost of the still existing forests. Large forests, though not immediately destroyed, were alienated by settlements and grants and were thereby withdrawn from further active interference on the part of Government. Security to life and property enabled the peasants and herdsmen to graze their cattle far from their homes and unprotected, and at the same time cattle increased in value. Herds naturally multiplied, and additional grazing areas being required were cleared by fire. Railways soon spread over the country, and forest-growth disappeared with an incredible rapidity within the reach of their influence. It was when failures to meet local demands for public works were brought to notice that the value of the forests was recognised, and this gradually led to the creation of a separate Forest Department.

As a matter of course, it rested with the Government to show the lead. After several local rules and Acts had been intoduced and had been in force for a longer or shorter time, the first Indian Forest Act was passed in 1865. This was, however, found wanting in many important respects, and was replaced by the Act of 1878. Even in this new Act, however, faults were recognised, and separate Acts were passed for Burma and Madras in 1881 and 1882, respectively. All three Acts provide for the formation of Government reserves and the settlements of rights within them, as well as for the constitution of village forests; and they contain police rules necessary for the protection of Government forests and forest produce. The Indian Forest Act contains in addition provisions for the creation of protected forests. All three Acts provide for the control of Government over forests not belonging to the State, if such control appears necessary for the public weal, or if the treatment which such forests have received from their owners injuriously affects the public welfare or safety.

More recently, special forest laws for the newly-annexed Province of Upper Burma, and for Assam and Baluchisthan, have been passed by the Indian Legislature, and these contain several improvements on the older Acts:—

| PROVINCES. | FOREST AREA IN SQUARE MILES. | | | | Proportion of forests to whole area of Presidency. | REMARKS. |
|---|---|---|---|---|---|---|
| | Reserved. | Protected. | Unclassed. | Total. | Per cent. | |
| Bengal Presidency | 47,118 | 82,883 | 17,661 | 93,662 | 14 | Includes 419 square miles of *leased* forests and 652 square miles *taungya* areas. |
| Madras „ | 9,436 | ... | (*e*) 7,751 | 17,187 | 20 | (*e*) Includes 154 square miles of *leased* forests. |
| Bombay „ | 10,310 | 4,200 | ... | 14,510 | 11 | |
| GRAND TOTAL | 66,864 | 33,083 | 25,412 | 1,25,359 | 14 | |

The Department is divided into an Upper Controlling Staff, a Lower Controlling Staff, a Protective Staff, and an Office Staff. The Upper Controlling Staff numbers at present 196 officers, of whom 64 per cent. have received a scientific training in forestry and were appointed in England by Her Majesty's Secretary of State. Formerly these officers were trained in France or in Germany; but since 1885, the education of such officers has taken place at the Royal Indian Engineering College near Windsor. The forest range is the unit of the present organisation, and the men intended for such charges as well as those intended for employment in Native States or by wealthy native land-owners are trained in the Imperial Forest School at Dehra Dun in the North-Western Provinces. Since the establishment of the school in 1878, 265 officers have been thus trained.

The protection of forests in which, previously to the creation of the Forest Department, no restrictions of any kind existed was, as may be supposed, a matter of the greatest difficulty. Boundaries were defined where no boundaries previously existed; or at least boundaries which had never formed a restriction had, under the Forest Law, to be respected.

As regards general protection, the laws, being new, had to be worked leniently. This has been done, and the progress reported from time to time is satisfactory. The greatest benefit conferred lies in the stopping of the method of shifting cultivation, locally known as *kumri, jhum* or *taungya*, in the Government forests of almost all provinces. In the protection of forest from fire there is still much to be learned and done, and in almost every province it is necessary to depend more on fire-tracing and fire-watching than on the help given by legislation. This is one of the most important questions connected with forestry, and consequently with agriculture, in India. Annual fires are the main reason of the barren condition of most of the Indian hill ranges, and are closely connected with agricultural distress and famine. Practical steps have been taken to prevent the spread of external fires into the more valuable Government forests. During 1891-92, 25,600 square miles were thus protected from fire at a total cost of Rs. 2,42,000, and the following table gives a *résumé* of the work done in 1892-93:—

*Results of fire-protection in the Forest Circles administered by the Forest Department.*

| CIRCLES. | TOTAL NUMBER OF ACRES. | | | Total Cost. | COST IN PIES PER ACRE. | |
|---|---|---|---|---|---|---|
| | Attempted. | Failed. | Protected. | | Attempted. | Protected. |
| | | | | R | | |
| Madras Presidency | 3,264,000 | 155,520 | 3,108,480 | 67,020 | 3·9 | 4·1 |
| Bombay „ | 6,713,898 | 834,223 | 5,879,675 | 28,733 | 0·8 | 0·9 |
| Bengal „ | 8,841,600 | 138,240 | 8,703,360 | 1,67,879 | 3·6 | 3·7 |
| TOATL | 18,819,498 | 1,127,983 | 17,691,515 | 2,63,632 | 2·7 | 2·9 |

By fire-protection, the regulation of grazing, and the general protection of the forests ample production is ensured, as a rule, after a shorter or longer period in the more valuable forests of India.

Most Indian forests are of a mixed character, containing only one or a few valuable species which repay the cost of working. Moreover, all age-classes are gene-

rally represented on the same area, and this necessitates working by selection (Fr. *jardinage*). It is self-evident that these facts make the problem of forestry—to secure a continuous yield proportionate to the stock on the ground without causing the deterioration of the forests—extremely difficult.

In former times demand was the only factor considered in working of the forests, but at present the effort is to aim at systematic conservancy and exploitation. In special connection with the preparation of working-plans, the Forest Survey Branch of the Imperial Survey Department has been formed.

The exploitation of timber, at least of the more valuable timber, from Government forests is carried out partly through the direct agency of the Department and partly by contractors. Of minor forest-produce, the most important at present are grass, hirda fruit (*Terminalia Chebula*), bamboos, cutch, cardamoms, catechu, and lac; but there are many others of less value. The estimated yield in timber and fuel, in cubic feet, of all Government forests was as follows during 1892-93:—

| Circles. | Government Agency. | | | Purchasers. | | | Right-holders. | | | Free Grants. | | | Grand Total. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Timber. | Fuel. | Total. | Timber. | Fuel. | Total. | Timber. | Fuel. | Total. | Timber. | Fuel. | Total. | Timber. | Fuel. | Total. |
| | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. | Cubic feet. |
| Bengal Presidency | 5,569,663 | 8,298,283 | 13,867,946 | 39,662,502 | 51,793,221 | 91,455,723 | 1,390,916 | 34,037,882 | 35,428,798 | 3,373,896 | 6,682,861 | 10,056,757 | 49,996,977 | 100,812,247 | 150,809,224 |
| Madras " | 292,300 | 2,038,099 | 2,330,399 | 2,634,450 | 10,098,923 | 12,733,373 | ... | ... | ... | 39,806 | 1,543 | 41,349 | 2,966,556 | 12,138,565 | 15,105,121 |
| Bombay " | 1,818,657 | 20,588,519 | 22,407,176 | 4,362,338 | 12,803,917 | 17,166,255 | 52,570 | 2,500,000 | 2,552,570 | 133,212 | 4,296 | 137,508 | 6,366,777 | 35,896,732 | 42,263,509 |
| Total | 7,680,620 | 30,924,901 | 38,605,521 | 46,659,290 | 74,696,061 | 121,355,351 | 1,443,486 | 36,537,882 | 37,981,368 | 3,546,914 | 6,688,700 | 10,235,614 | 59,330,310 | 148,847,544 | 208,177,854 |

The following table exhibits information in respect of the sea-borne exports of forest-produce from India to foreign countries in 1892-93:—

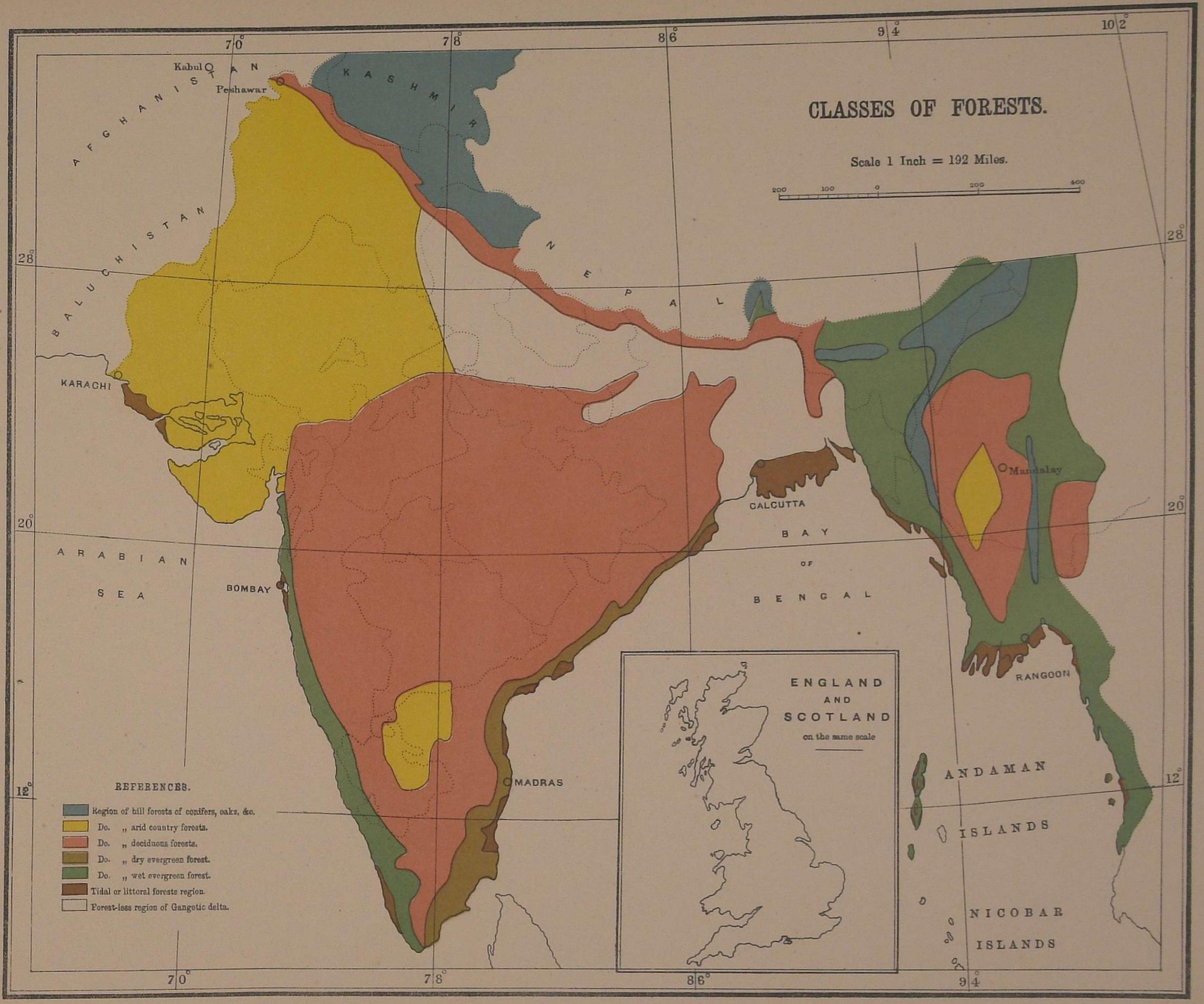
| Articles. | Cubic tons. | Valuation at port of Shipment. | |
|---|---|---|---|
| | | Total. | Per Ton. |
| | | ₹ | ₹ |
| Caoutchouc . . . . . . . Tons | 499 | 13,07,819 | 2,621 |
| Shell-lac . . . . . . . . " | 5,103 | 64,38,513 | 1,261 |
| Lac-dye . . . . . . . . . " | 12 | 10,090 | 841 |
| Sandal, Ebony and other Ornamental Woods . . | (Information not available) | 6,92,585 | ... |
| Cutch and Gambiers . . . . . . . | 11,466 | 31,24,840 | 334 |
| Myrabolams . . . . . . . . . | 33,377 | 33,67,093 | 100 |
| Teak . . . . . . . . . | 58,350* | 57,01,024 | 98 |
| Cardamoms . . . . . . . . . | 136 | 2,96,969 | 2,184 |
| Total in 1892-93 . | ... | 2,16,38,933 | ... |
| " " 1891-92 . | ... | 2,02,62,100 | ... |
| Increase in 1892-93 . . . . . . . | ... | 13,76,833 | ... |

* Quantity in tons of 20 cwt. in the case of Teak.

Arrangements have recently been made for the dissemination of information on these and other important Indian forest-products among the commercial community and other persons in Europe interested in the trade. Monographs on the more important products appear from time to time in the pages of the *Indian Forester*, and are subsequently republished in the series of cheap hand-books issued by the Imperial Institute in London.

The financial results of Forest Administration in India have been as follows:—

| Quinquennial periods. | Revenue. | Expenditure. | Surplus. |
|---|---|---|---|
| | ₹ | ₹ | ₹ |
| 1864-65 to 1868-69 (annual average) . . . . | 37,38,189 | 23,81,732 | 13,56,457 |
| 1869-70 to 1873-74 ditto . . . . | 56,25,693 | 39,89,632 | 16,36,061 |
| 1874-75 to 1878-79 ditto . . . . | 66,55,913 | 45,67,372 | 20,79,541 |
| 1879-80 to 1883-84 ditto . . . . | 87,84,514 | 56,07,652 | 31,76,862 |
| 1884-85 to 1888-89 ditto . . . . | 1,16,68,148 | 74,26,956 | 42,41,192 |
| 1889-90 . . . . . . | 1,53,03,572 | 80,12,518 | 72,91,054 |
| 1890-91 . . . . . . | 1,49,67,135 | 80,63,125 | 69,04,010 |
| 1891-92 . . . . . . | 1,53,63,706 | 86,23,852 | 67,39,854 |
| 1892-93 . . . . . . | 1,63,44,336 | 88,81,484 | 74,62,852 |

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NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

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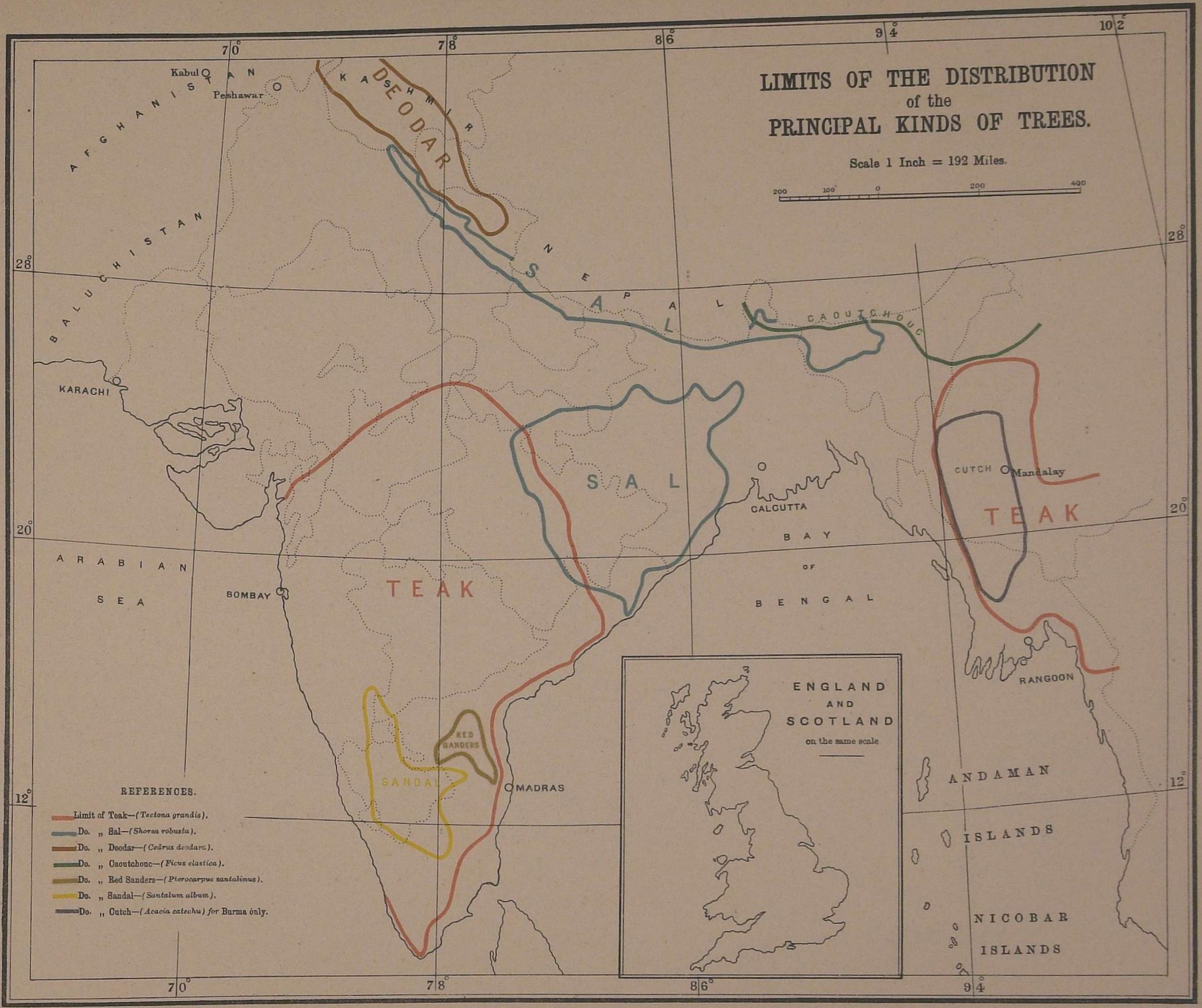


Reg. No. 111, R. & A.—Aug. 94.—2,066

NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

Zinco., S. I. O., Calcutta.

# CHAPTER VIII.

# HORSES AND LIVE STOCK.

It requires no profound powers of observation on the part of a traveller through almost any part of India to enable him to discover that although almost every European in the country is a horse-owner and the subject of horse-supply is much thought of, he is really in a bad horse-country. Every horse of good size and value is either an imported animal or the produce of some recently imported foreign sire, and the stranger, if he is versed in history, wonders what has become of those indigenous breeds which did the work of the country in past centuries, and, so far as we can judge from the reports which have come down to us, did it very well. He will find that in most cases the progress of peace in the country has gradually but surely entailed the neglect and degradation of the stock of horses. He will find, or a reference to the map below will show him, that in Bengal and Madras, which have rested from war for many years, the horse is to a large extent an unknown animal: it is no longer wanted for the troops of marauding Chiefs and the bullock has taken his place as a beast of carriage. In Bombay and North-Western India, on the other hand, horses are still fairly plentiful, and their quality, though inferior, has been kept from any large measure of deterioration by the constant influx of foreign sires by way of the Indian Ocean or the passes of Afghanistan. The Chiefs of Kathiawar and Rajputana still keep their martial instincts and take an interest in their studs; while the cultivators of the Upper Ganges and the Punjab preserve to a large extent their affection for, and constant use of, the animal on which the lives of their forefathers so often depended.

In rich river countries it is impossible to breed horses. In such, any breed, however good it may originally be, deteriorates; therefore in Lower Bengal, the Carnatic, and Lower Burma horses are not found. In the whole of Madras, below the ghâts, country-bred horses are not to be had; ponies are sometimes to be seen and Government is making every effort by the introduction of stallions to improve the breed in the Coimbatore District, but here the agriculturist appears to lean towards bullock traffic. The Nizam's dominions may be divided into bullock and horse countries, the Western Mahratta being the horse country. Bombay is making some headway in horse-breeding. Horse stallions and pony stallions are employed in the Presidency and in Sind. The breeds are many and not always well distinguished; but among them are observed the hardy Mahratta pony of Bombay, and the little Guzerati with his pluck and staying power. Kathiawar still possesses many horses of its original breed which was so noted for its great powers of endurance. The Chiefs of Kathiawar are beginning to interest themselves in horse breeding, and it is hoped that in time this tract of country, so well adapted for this industry, will once more become famous, as it originally was, for its good breed. The Bhavnagar and Palitana rulers deserve special mention for the interest they take in the matter.

Proceeding northwards we have to notice the horses supplied by the Frontier tribes. The "Waziris" have a very fine breed of horses, very hardy and active, but not adapted for cavalry as they seldom exceed 14 hands. Baluch mares are worthy of much notice. Meyrick, one of the leading authorities on Indian Horse-Breeding, describes them as "animals with good shoulders, very deep and moderately broad chests and angular drooping quarters, very broad across the hips." They make excellent troopers on account of their speed and endurance and crossed with large framed Arabs and thorough-bred English horses, they produce excellent light Cavalry Remounts. This leads us to deal with the same observer's views on the horses of the Punjab. "They are modified here and there," he says, "by admixture with Persians, Arabs, and Kabulis, but are mainly of one type, having heads rather long, narrow, plain, and noses inclined to convexity, shoulders deep and fairly oblique; chests deep; barrels and loins good; quarters broad enough, but far too drooping and not so muscular as they ought to be in proportion to the rest of the body: although too small under the knee according to our English notions they rarely fail there with the work the natives give them. Their feet are good and sound, seldom shod, generally deformed from neglect. Sickle-shaped hocks and toes of the fore-feet much turned out are the most common defects and result from the defective conformation of the animal, thus want of exercise checks growth in width of the chest. Sickle-hocks seems to have become hereditary among them due to the use of spiked bits for some generations past and the heads being so tied with the standing martingale that they cannot, even in the slightest degree, escape the bit, so they go with the hind-legs much under them and with very cramped action, spavin and sprained hind fetlocks are the most common causes of unsoundness.

"The horses of the desert tracts to the south are better shaped and more sound than those of the north, for the inhabitants of the former region used to be marauders and have to give their horses thorough exercise regularly in going long distances from village to village. Nearly all the land owners ride mares because they are tractable and useful, as well as profitable for breeding from. On a journey they go at an amble (4 to 6 miles per hour) and the foal runs with the dam. The mares range from 14 to 15½ hands in height (being occasionally 16 or more, the best being 14-15), well bred, very hardy, capable of long continued work upon scanty food under a hot sun. They would, with good stallions and produce reared in a rational manner, supply good useful remounts fit for European Cavalry. Even the fillies are confined while the crops are growing, the colts are constantly tied with head and heel ropes from the time they begin to be troublesome with mares, therefore they show the bad effects of defective exercise much more than the mares. Although up to two years of age about equal in freedom and power of movement, after that age the colts become cramped in action, half developed in frame, narrow in

chest and quarters, and have the most miserable action conceivable, and transmit these defects to their offspring.

"Such is the indigenous material with which the department of Horse-Breeding Operations has to work; the mares thus described have to produce animals suitable for all branches of the Indian Army. In other parts of British India, not hitherto noticed, the country stock is inferior to that of the Punjab and, accordingly, less satisfactory to work with."

Even in those districts, however, in which the horse is best known and best cared for, the principles of breeding are not carefully followed, and the early treatment, feeding, bitting, etc., of the animal have deteriorating influences. The constant aim of the Government has been to grant facilities for the improvement of the stamp of horse or pony in use, and to spread a knowledge of its proper management. The matter has special weight in a country where the proper equipment of the mounted branches of the army is so very necessary and the importation of foreign horses for the purpose is so very expensive. The development of horse-breeding in India is placed under the superintendence of the Civil Veterinary Department—a newly constituted service, manned by a small superior staff of officers chosen from the Veterinary Department of the Indian Army, and by a larger subordinate staff of trained native practitioners. The Imperial Government provides to the public free of charge the services of some imported stallions, mostly of Arab, English, or Australian origin, and though the number is still far short of that which the great horse-breeding countries, such as Hungary, provide, yet the supply is being gradually increased as funds allow, and it is supplemented by a fast-developing staff of stallions provided at the charge of Local Funds or by the liberality of private owners who take an interest in horse-breeding. No mare is, as a rule, permitted to use the services of a Government stallion till she has been passed by a Veterinary officer and branded with the Government mark, and as a further encouragement to owners to bring forward mares for branding, the greater number of the prizes granted by the Government and by local bodies at Horse Shows and Fairs are confined to branded mares or to the produce of branded mares and Government sires. Efforts are also made under the superintendence of the Civil Veterinary Department to train a subordinate staff of native employés in veterinary service, and educational institutions have with this object been started at Bombay, Lahore, Calcutta, Ajmere, and Rangoon, which annually turn out a number of students equipped, some with a fairly advanced, but all with at least a rudimentary knowledge of veterinary matters. Such of these students as choose to work in the service of Government are employed as practitioners for the free castration of colts and the supply of advice and medicines to owners whose animals are sick or lame. It is hoped that as time goes on the system may be further improved and that by this means the horse-supply of the country may by degrees be developed and assured.

The Government has at the same time been careful, by the supply of donkey stallions and by the grant of prizes at fairs, to encourage, as far as possible, the development of mule-breeding—an industry which is of special importance in view of the value of these animals for transport purposes in time of war and for the equipment of mountain batteries. The native population have in many parts of the country a semi-religious objection to the breeding of mules, but this prejudice is by degrees disappearing and the development of mule-breeding, more specially in Northern India, has so far been fairly satisfactory. Some slight encouragement is also given by the Government towards the improvement of the native donkeys—a race at present very much neglected and despised, the importance of which is often overlooked.

The attention of Government has long been attracted to horse-breeding on account of its close connection with the efficiency of the army, but, although the rearing of bullocks for the army transport service and a certain limited provision of bulls among the people for rearing purposes has been undertaken by the State, it is only very recently that the Government has paid serious attention to the improvement of the country *cattle*. And yet the importance of the cattle as an item in the welfare of the country can scarcely be overrated; the bullock or the buffalo is used almost everywhere for pulling the plough, for the carriage of loads, and for the drawing of carts and carriages; in the north they are the agency employed for drawing from the wells the water on which the existence of the crops depend. The cow or she-buffalo, moreover, is the producer of the *ghi* and the butter-milk on which the native population which does not eat meat is almost everywhere dependent. The ordinary stock of the agriculturist is capable of much improvement, and it is believed that this can be effected by a due distribution of sires from the more celebrated and well-developed breeds of the country, such as the famous *Amrit mahal* of Mysore, the oxen of Nellore and Karnul, the handsome bulls of Gujrat, and the strong Hariana breed of the South-Eastern Punjab. At the same time steps have to be taken to meet the appalling loss of agricultural capital occasioned by the ravages of diseases, such as rinderpest, which so frequently break out in India, and in dealing with which the native practitioner is of little avail. Owing to the veneration with which the Hindu population regard their oxen, it is impossible to stem the progress of disease by compulsory slaughter, as in most European countries, and measures of segregation can only be undertaken at present in a very tentative way. The subject is being specially considered by the new Civil Veterinary Department, and a special bacteriological staff has been attached to the department in the hopes that a scientific study of the more virulent forms of disease may lead to the discovery of some form of prophylactic inoculation.

The agricultural and pastoral stock of the country includes a certain number of sheep and goats, for the improvement of which little or nothing has yet been done, and of which the local distribution is roughly indicated by the small maps below. The camel also is plentiful in the sandier parts of North-Western India. It is a most useful animal both for carriage and for milk, and was used largely in the last Afghan War for transport purposes. The best riding camels are said to be those of the Bikanir country, just south of the Punjab.

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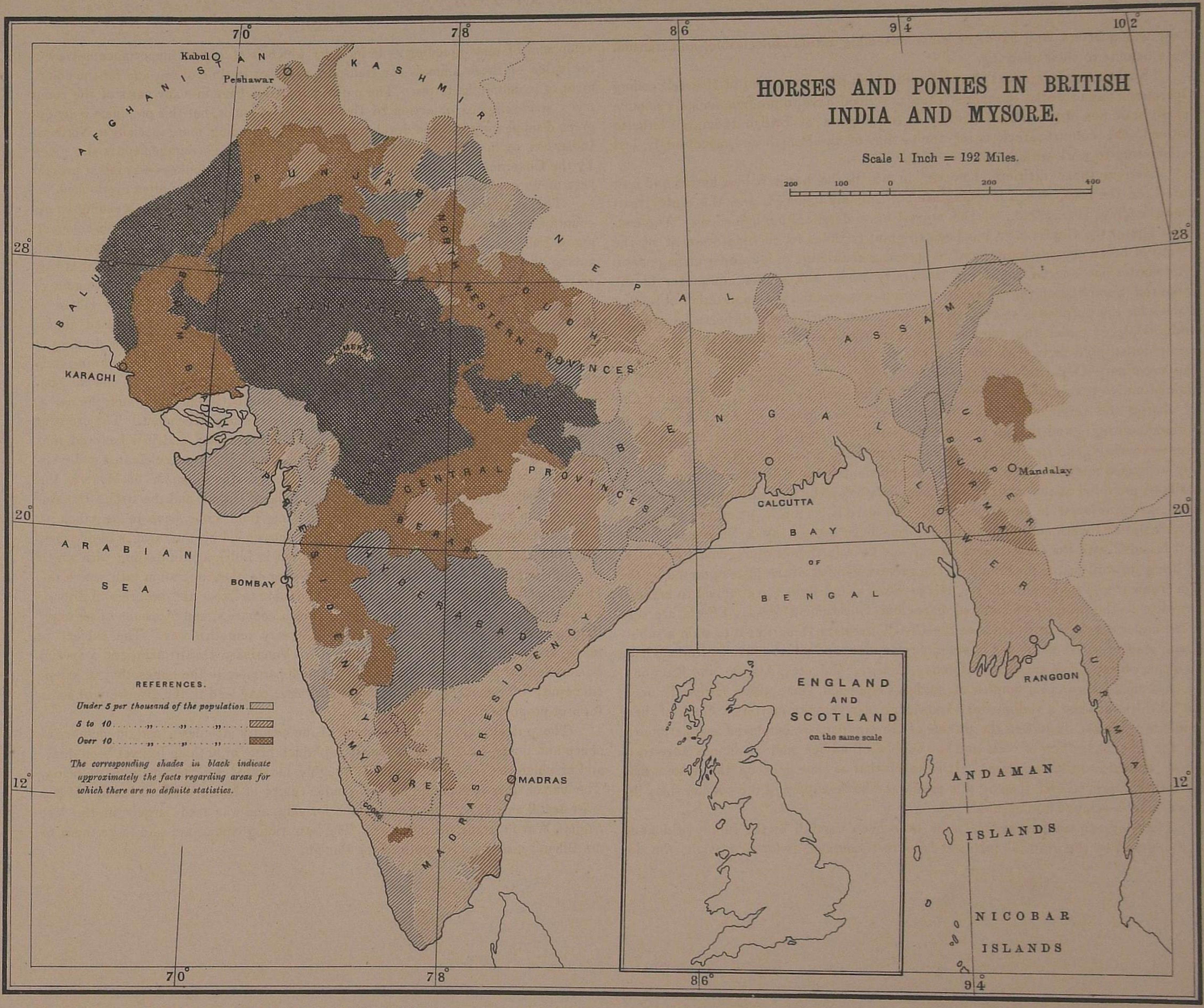
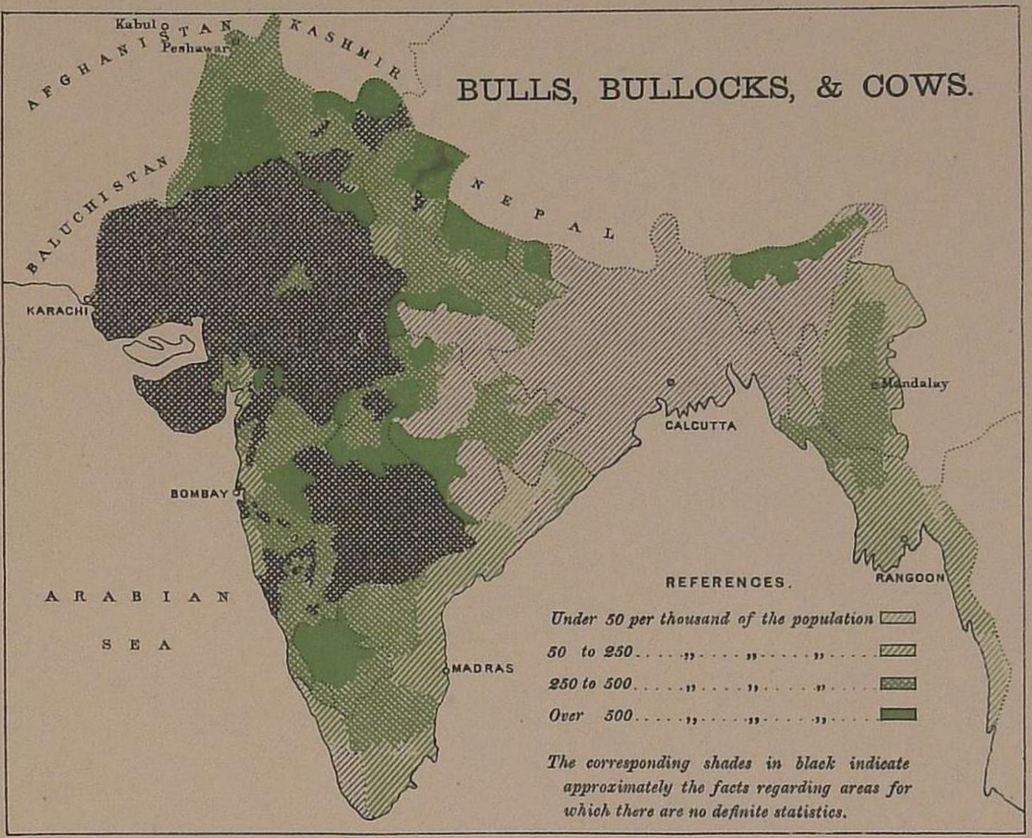


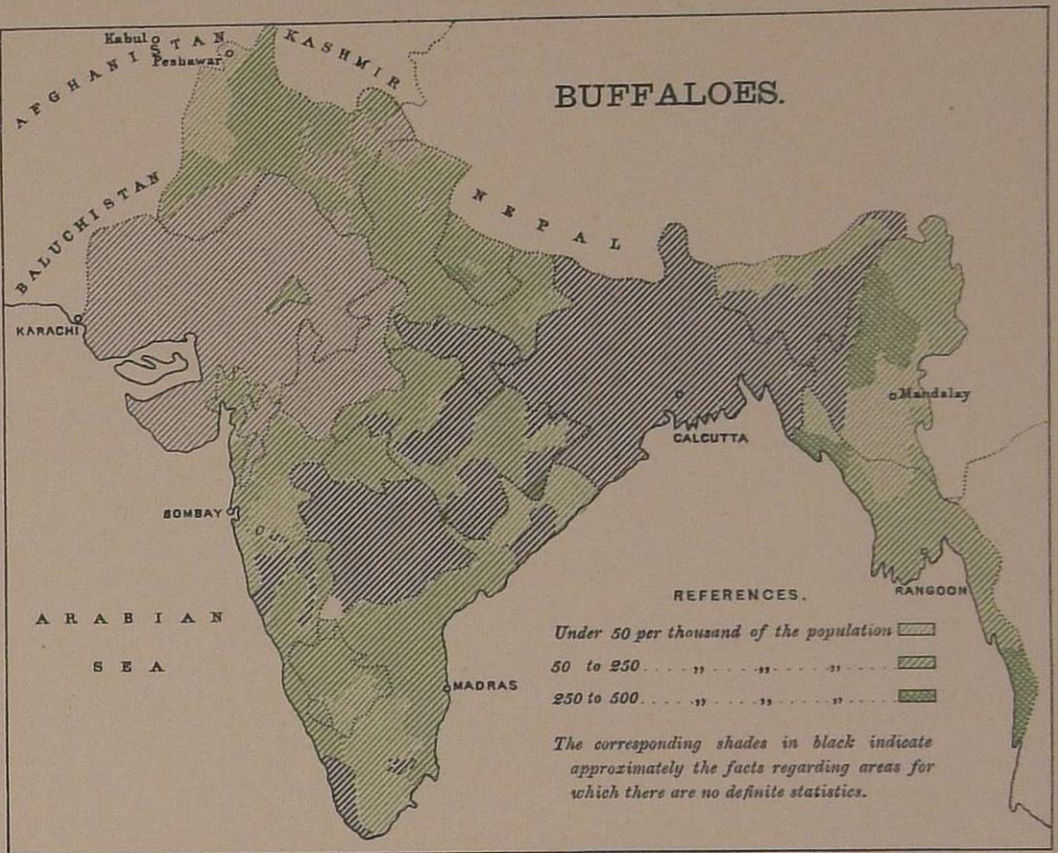

Reg. No. 263. R. & A.—Dec. 94.—2016.

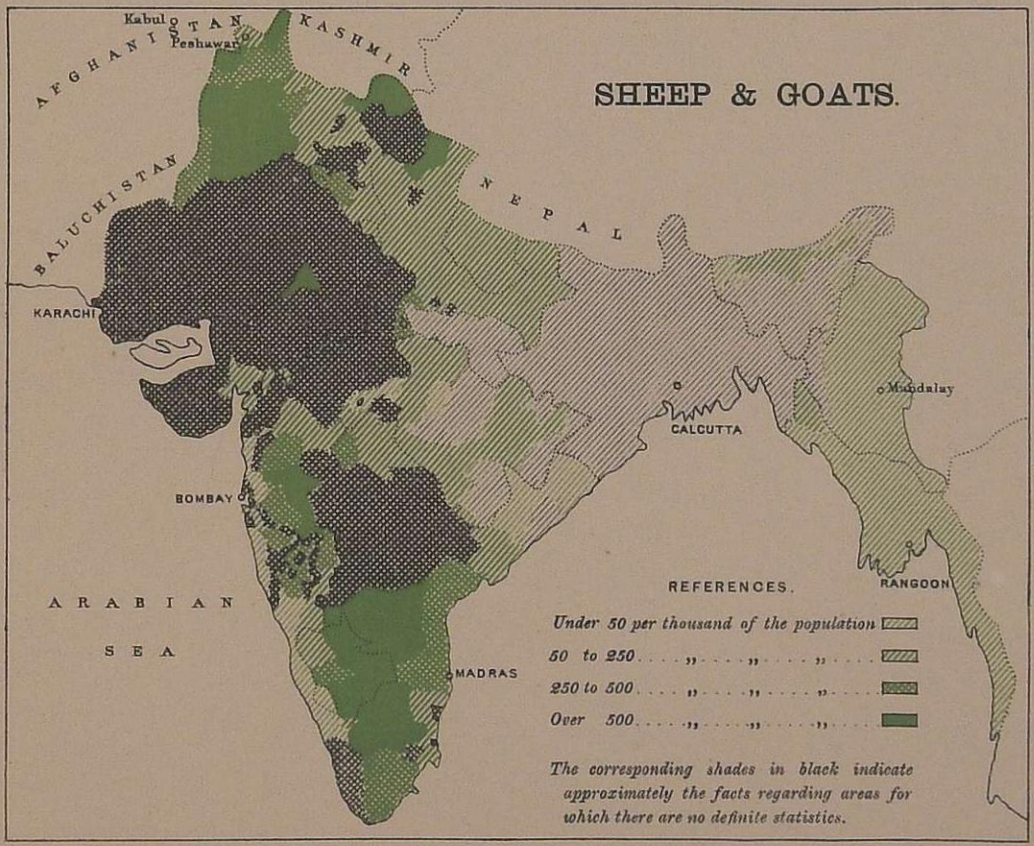
NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

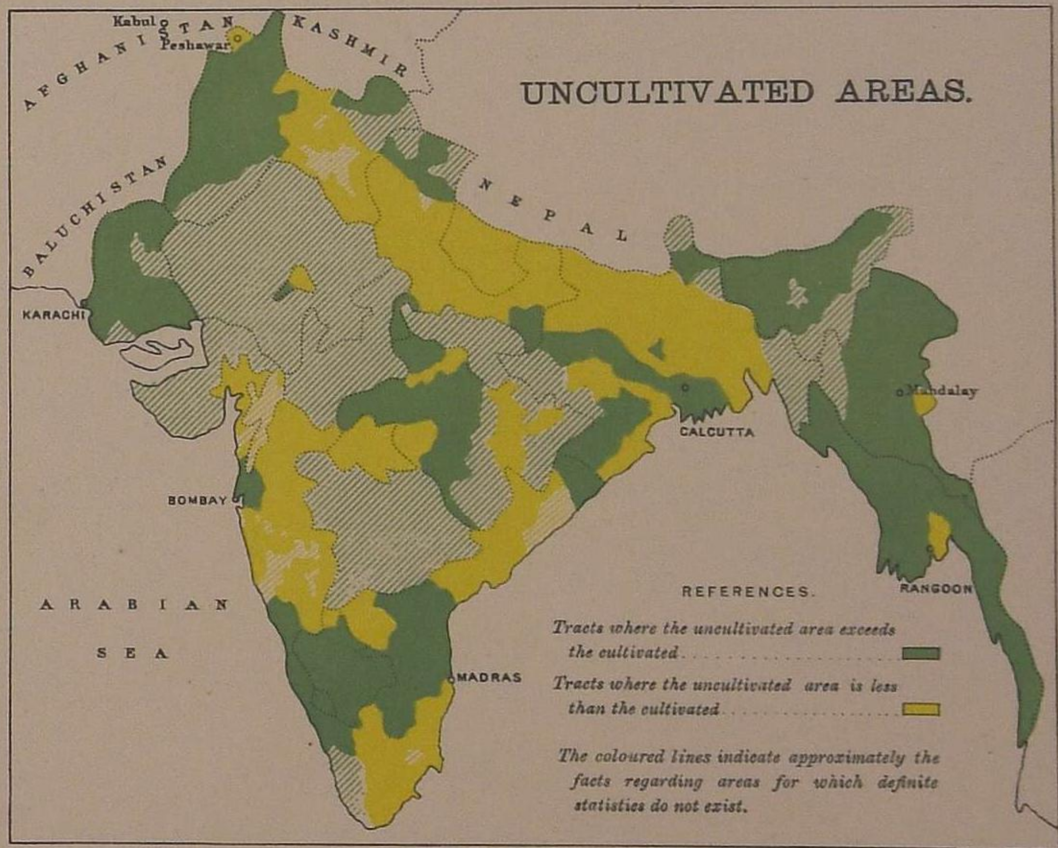
Litho., S. I. O., Calcutta.

# LIVE STOCK.




NOTES.—Statistics for cattle and buffaloes do not include young stock.
Figures are not available for Bengal, or Native States and parts of the Central Provinces.
The black shading, and in the fourth map the coloured lines indicate approximately the information relating to these areas.

Litho., S. I. O., Calcutta.

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# CHAPTER IX.

# ECONOMIC MINERALS.

As viewed in the light of its vast area, and more especially as contrasted with European countries, India is remarkably deficient in minerals. It cannot, however, be held that her possibilities in this direction have been fully ascertained. On the contrary, compared with the state of affairs that prevailed twenty years ago, the present mineral production of India is far in excess of anything then even contemplated. Of Coal, Iron, and Salt, India possesses inexhaustible supplies, the mines at present worked do little more than tap the sources within easy access to the existing railways, and hence every new railway may be regarded as calculated to increase the production of, and extend the demand for, the commoner minerals. A glance at the miniature map of India below, which shows the distribution of iron, will suffice to convey an idea of the abundance and wide distribution of beds of that ore. The instructive fact that, within the past four years, the Government have issued 37 new grants or licenses to mine for coal, betokens the rapidly awakening mining enterprise of the country. Speaking geologically, however, it must be added that production on a commercial scale cannot be expected to extend beyond certain well-defined areas of particular rock formations.

Of the six special rock series of PENINSULAR INDIA (discussed in Chapter II) only four contain minerals.

Of these, the *Crystallines* are very widely distributed, and iron, corundum, and gold have been found in them.

The *Transition* formations may be called the metalliferous series of India, and yield gold, iron and its associated manganese, and copper in the Dhárwárs of Mysore, Bellary, and the Raichur Doab of Southern India; iron with manganese, copper, lead, and some gold in the Bijawars of the Central Provinces; iron, copper, lead, gold, and some tin in Western Bengal; and copper, lead, iron, and inferior gems in the Aravalis of Central India.

The chief mineralogical interest of the *Vindhyan* formations lies in the occurrence of diamonds in the Kurnool and Kistna area of Madras, in Pannah of Bundelkhand, and to a less extent in the eastern borders of Chhattisgarh.

The *Gondwanas* contain the coal. From the coal map it will be seen that these measures radiate from Mohpani in the Central Provinces eastwards to Bengal, south-eastwards to Orissa, and south-south-eastwards to the Pranhita-Godavery valley.

Turning now to EXTRA PENINSULAR INDIA, it may be said that the formations met with are so contorted and folded together that they have given origin to what may be called inaccessible mountain tracts. In consequence the mineral wealth of many portions of these regions is but indifferently known. Coal, though of an altogether newer age than that of the Gondwanas (except that of the Eastern Duars), is again the important mineral. Tertiary coal occurs at Khost in Baluchistan and at Dandot and other localities in the Punjab. So also Tertiary and Cretaceous coals are found in Assam and Tertiary coal in Burma. Rock oil is tolerably abundant in Upper Burma, promisingly so in Assam, and extractable, to some extent, in the Punjab and Baluchistan. The miniature map for oil, below, will be seen to manifest two somewhat parallel chains of wells that extend from Thayetmyo in Burma, more or less north to Upper Assam; it also indicates the scattered sources of this mineral in the Punjab and Baluchistan. Throughout the vast intervening area of Peninsular India no occurrence of mineral oil has as yet been recorded.

Such then is a brief statement of the Indian minerals in relation to geological formations, but the task is a more difficult one to furnish definite particulars regarding actual mines and mining interests. Statistical returns are in many cases impossible; moreover, the centres of what might be called commercial production are often severely isolated or remote from each other, and after all only four minerals are of such importance as to necessitate their being shown by maps. These are COAL, IRON, OIL, and TIN, though to these might have been added SALT. It may serve the purpose here aimed at, therefore, to refer the minerals of India to two sections.

### Section 1st.—The More Important Minerals.

1ST, COAL.—The Coal map, in the accompanying plate, shows the areas of distribution, although the small scale has necessitated a running together of the separate fields in continuous strings of colouring. These may, however, act as guides to the following summary of the production, working, or prospective value of the coal fields:—

*Assam.*—Collieries are in full working order at Makum, with an output in 1892-93 of 154,655 tons. Coal is also worked at Cherapunji and Maoflong; but it is as yet only prospective at Darangiri, Lakadong, Dizai, Jaipur, and Nazira.

*Baluchistan.*—The collieries at Khost turned out, in 1892-93, 13,064 tons. Some coal is worked in the neighbourhood of Quetta: that at Mach is prospective.

*Bengal.*—There are now altogether about 70 collieries; twenty-five of these are in Raniganj and Barákar. These turned out in 1892-3 a little under a million and a half tons. In Karharbari and Giridih, the four great collieries of the East Indian Railway, the Bengal Coal Company, and the Raniganj Coal Association, turned out 578,493 tons during the same year. In the Sonthal Parganas three collieries yielded an output of 24,513 tons. The Jherria field has now been opened up by railway and collieries started. The prospective fields, some of which are being

slightly worked, are Rajmahal, Bokaro, Ramgarh, Karanpura, Aurunga, Hutar, Daltonganj, Eeb river, Talchir, Darjeeling, and Lissu river.

*Burma.*—A colliery is being worked at Kabwet (the Thingadaw mine), which, however, is only turning out a little under 1,000 tons a month at present. There are other prospective fields on the Chindwin river, at Lashio in the Shan States, and in Tenasserim.

*Central India.*—The collieries at Umaria yielded, in 1892-93, 78,725 tons. Prospective fields are at Sohagpur, Singrauli, and Bisrampur.

*Central Provinces.*—The output at the Mohpani colliery for 1892-93 was 17,272 tons; that of Warora for the same year was 117,918 tons. The prospective fields are at Shahpur, Pench, Korba, Mand river, Raigarh, and Hingir.

*Godavary Valley (Madras).*—The Singareni collieries (Nizam's Dominions) in 1892-93, yielded, 139,918 tons. The prospective fields, in one of which there is some small working, are at Kamarum, Cherla, Madavarum, and Beddadanol.

*Kashmir.*—There is a prospective field at Sangar Marg.

*Punjab.*—The Dandot and Bhaganwala collieries in the Salt Range yielded in 1892-93, 55,914 tons. Other shows of coal are in the Chitapahar, and in the Hazara and Bannu districts.

If now we attempt to reduce these particulars of the Indian coal production to a more statistical form, it may be said that there are in India some 82 coal-fields actually being more or less worked and 37 being prospected. The average production from these, during the three years preceding 1893, was as follows:—From mines in British Provinces, 2,115,672 tons, and in Native States, 231,717 tons. During 1893 the total output for all India came to 2,529,855 tons. It is important to recollect that Bombay, the North-West Provinces, and practically also Madras and Burma, do not contribute to the Indian supplies, but, on the contrary, draw upon the other provinces for the coal they require or import from foreign countries. Accordingly, the inter-provincial trade by sea may be said to be from Bengal to Bombay, Madras, and Burma. In judging, therefore, of the growth of the industry, more particularly its competition with foreign coal, it is necessary to follow these coastwise transactions rather than to look for the expansion of an export traffic to foreign countries. The following facts may be regarded as significant: the exports from Bengal to Bombay were in 1889 returned at 13,436 tons, in 1893 at 45,595 tons; Bengal to Madras in 1889, 2,270 tons, in 1893, 60,570 tons; and Bengal to Burma in 1889, 23,814 tons, in 1893, 88,611 tons. The recent miners' strike in England gave, moreover, a great impetus to the export of Bengal coal not only to Burma and other Indian ports but to certain foreign countries. Ceylon, for example, affords a steady market, and it seems probable the strike alluded to has done irreparable injury to the Asiatic markets of England. The imports of coal by India have declined from 877,843 tons in 1888-89 to 703,341 tons in 1892-93. Nearly one million tons of coal are used by the Railways of India, the remainder (imports 703,341 tons *plus* production 2,347,389 tons) is used by the shipping, Indian factories and other industries. Coal is practically not in demand in India for domestic consumption but coke is coming into use in the larger cities.

2ND, IRON.—The iron map below, dotted as it is with spots to denote iron localities all over the country, indicates the very widely distributed occurrence of this ore. As a matter of fact, however, the only place where iron and steel works are carried on, is among the clay-iron-stones of Barákar in *Bengal*, where the output for 1893 was 29,930 tons. Of the other localities indicated in the map it may be said there is merely somewhat desultory working by native smelters. The production for 1893 in *Madras* was 677 tons; *Punjab*, 23 tons; *Central Provinces*, 3,332 tons; *Mysore*, 707 tons; *Kashmir*, 5 tons; *Central India* Agency, 1,667 tons, *Rajputana* States, 767 tons.

The chief iron areas of Bengal are Barákar, Chaibassa, Itori, Karanpura, and Rajbar; of Bombay, Mahableshwar and Malwan; of Central India, Bijawar, Dhuwara, Punniar, Kirwar, Rajgarh, Ganjar, Barwai, and Chandgarh; of the Central Provinces, Kutni and Sihora, (with manganiferous hematites), Tendukara, Lohara, Rutnapur, Pipalgaon, Dewalgaon and Junjawali; of the Nizam's Dominions, Nirmal, Singareni (with a very fine show of hematitic and magnetic ores), and Polarum. Of Madras, it may be said that there is the splendid show of magnetite and chromic iron ore of Kanjamali and Godamali in Salem; a further very extensive display of specular iron ore near Ramulkotta in Kurnul; and a like exhibition of hematite schists, some of which are manganiferous, in the Sundur hills of Bellary; besides many other native workings at Hungund and Towaragiri in Mysore, and at Rasanur, Ongole, Rajamundri, Madugala, and Chitra in the Northern Sircars. In the North-West Provinces, hematite and magnetite occur at Dechaur; and in the Punjab, in the Kirana hills, Kohat, and Chaita.

From the abundance of iron ores of superior quality it may therefore be surmised that the future will see an immense expansion of India's production and utilization of its supplies of this metal. Indeed it is just probable that Europe may, at no very distant date, have to look to this country as a source of magnetic iron ore. The want of enterprise, the initial expense, and the difficulties of a new industry which is so intimately dependent on fuel supply, may be regarded as the chief reasons of the smallness of the progress made. But with the rapidly expanding production of good and cheap coal, together with the greatly improved facilities of transport, the future may confidently be looked forward to as one of greatly increased activity. The scope that exists for this, in meeting the home (Indian) demands may be inferred from the fact that last year (1892-93) the imports of iron (wrought and unwrought) were valued at R27,358,470; of steel at R4,134,884; of hardware and cutlery at R13,412,774; of machinery and mill-work at R24,778,351; and of railway plant at R23,219,895. The rapidity with which the use of corrugated iron roofing has spread over the country and is spreading, to mention a comparatively speaking small section of this import trade, shows what the prospects may become of a future indigenous iron industry. Iron enamelling has been started in India, but has as yet made but comparatively little progress. The possibilities of this smaller industry (eminently suited to the Indian worker's possibilities) may, as in many other branches of the hardware trade, be said to be dependent on a larger and more convenient supply of indigenous metal.

3RD, OIL.—As already stated this mineral product is exhibited in extra-peninsular India only, and even there at very distant places. In *Assam*, in the Lakhimpur District, there are four wells at Digboi which yielded 17,638 gallons for the first half of 1893, and seven wells at Makum, the output of which for the same period was 3,864 gallons. Cachar shows mineral oil in several places. For *Baluchistan*, Khattan used to be the area of special exploitation, but the works there have been abandoned; the output of thick black oil during 1889 appears to have been about 40,000 gallons. Other localities of oil-show are Kirta and Shorán. *Burma* has been long known for its oil-

wells in Yenangyoung where, in 1891, there were 373 productive pit-wells producing, 2,793,980 gallons, and 43 drill-wells yielding 1,516,975 gallons. *Akyab* produced 59,295 gallons in 1889 from wells in the Boronga Islands, and from several wells in Ramree Island the output was 15,140 gallons. Other wells and shows of oil occur at Bondoung, Yedu, Thelin, Minbu, Pakoku, Thayetamyo, Yemana, and on the Yu river. In the *Punjab* or on its borders, poor oil-wells occur at Alagad, Fattehgunj, Jaba, Mogul Kot and Panoba.

The total production of petroleum in India during 1893 was returned at 10,359,812 gallons, valued R7,97,269. The field that remains to be contested by the Indian industry may be inferred from the following facts :—imports in 1888-89, 39,851,885 gallons, valued at R18,612,803, and in 1892-93 67,085,968 gallons, valued at R26,902,640. These imports have checked the natural expansion in the cultivation of certain oil seeds, if indeed they may not be said to have ruined completely many indigenous industries. It is all the more necessary therefore that a larger share should be taken by the Indian wells in the rapidly expanding trade in this article. And this seems to give tokens of being the case though more capital is doubtless needed.

4TH, TIN.—The Tin ores are only known as yet to occur in any very promising quantity in the Maliwun subdivision of the Mergui district of *Lower Burma*, where the mines form a portion of the great stanniferous belt which stretches along the granitic backbone of the Malay peninsula. In the Mergui district they extend continuously from the Siamese frontier along the whole sea-board to at least the latitude of Tavoy. The interior is but little known; and it seems that out-crops of the granite, with which the tin is associated, are more plentiful towards the coast. Judging, however, from the fact that heavy tin is worked on a commercial scale at Thibawleik in the Tenasserim valley, and that tin is found in the Siamese States of Bantaphan, of Chomphom and Faungswan, along the Gulf of Siam, it is hoped that the main watershed may be found to throw off spurs of stanniferous granite at least as valuable as the out-crops in the secondary axials along the coast. In the Maliwun subdivision there are four main centres at which tin is worked, which belong to a practically continuous stanniferous belt which runs for 200 miles north and south, with a mean width of perhaps 20 miles.

In the Malwin and other fields the tin occurs in more or less imperfect fissure lodes, frequently shattered and distorted by more recent movements. The lodes, except Khowmaung near Maliwun, where a few Chinese have been for some time picking at the out-crop with crow-bars, are not worked commercially; but specimens of heavy tin ores received from Hangpon, Bokpyin, Sadein, and Thibawleik prove these lodes to be widely distributed. The alluvial tin has been derived from these lodes by the gradual denudation of the hills containing them, and is now deposited in the form of a more or less coarse sand mingling with the gravels and other alluvial deposits in the river valleys and gentle slopes at the foot of the granitic hills. In these the ore is extracted by a simple process of alluvial working, and smelted with charcoal in a small open blast furnace. The total present output for the subdivision is about 70 tons of metallic tin per annum. The industry, which has been for many years in a depressed state, is reviving. It is very hard to say how many persons are actually employed in it, as the bulk of the extra hands employed in the rains are as much fishermen or agriculturists as miners or persons actually deriving their main subsistence from mining pure and simple. The number of miners solely employed as such is, however, rapidly and satisfactorily increasing. The exports of tin from Mergui in 1893 were 1,308 cwt., valued at R82,829.

5TH, ROCK SALT.—This mineral, which is of great value, and found in enormous quantities, may be here mentioned. Magnificent beds of this most useful article occur in the Salt Range and in the Kohat district of the *Punjab*. In the former tract, magnificent mining operations are being carried out, in beds of rock salt, some of which run to 300 feet in thickness. The output for the Punjab in 1892 was over 100,000 tons. The other sources of salt are concentration by evaporation from the waters of the great Sambar Lake in *Rajputana*, and from the salt pans, constructed along the coast tracts of the peninsula. The total quantity of salt produced in India in 1892 is returned at 898,909 tons, valued at R4,629,574.

### Section 2nd.—The Less Important Minerals.

*Gold.*—The production of *Gold* in India is nowhere considerable except in *Mysore*, where mining operations have been conducted under European management for some years; the yield for 1892 was 163,187 ounces. Returns are also available from Madras of 961 ounces; North-West Provinces, 76 ounces; Punjab, 447 ounces; Kashmir, 101 ounces; Hyderabad, 57 ounces; Burma, 32 ounces; Bengal, 1 ounce.

*Copper and Lead ores* are widely distributed. Copper occurs in Singhbum and Dalbhum, and in the Banka Sub-division of the Bhagalpur district, Bengal; in several places in the Chanda and Jabalpur districts of the Central Provinces; also in Rajputana in some of the independent States, and in the British district of Ajmere where mining was formerly practised on a large scale, but is now almost extinct. Native mining operations are also carried on in Kumaon, Garhwal, the Western Duars, and in the Darjeeling district. The only available statistics are from Bengal, where the outturn during the year 1891 was estimated at 250,000 tons.

Lead ores are distributed very much after the localisation already given for copper ores. Special sites of old workings are at Gazalpali, in the Karnul district of Madras; in the Panchmahals and Narakot of the Bombay Presidency; in the Sambalpur and Raipur districts of the Central Provinces; and at Dhadka in Manbhum. Galena has been mined for in Ajmere, Alwar, and Udaipur; other mines and works also occur near Subathu in the Simla district.

*Diamonds* are found in the Kistna valley side of the Deccan; in the districts of Anantapur, Cuddapah, Karnul; and at Ellore in the Madras Presidency; in Chota Nagpur and the Central Provinces and in Bundelkhand. From the Kistna valley the outturn for 1888—89 is recorded as 93 carats. The value of the diamonds extracted from the mines in Bundelkhand during the year 1892 is put down as R9,231.

The chief *Ruby* mines of Upper Burma are situated in the neighbourhood of Mogok and Kyatpyin in the Ruby Mines districts, the yield from which in 1889 was 628 carats. The yield of *Spinels* from the same district was 4,496 carats.

Of *Gem Stones*, may also be mentioned the amber-like mineral, lately named *Burmite*, which occurs at Maingkhwan in Upper Burma, the yield of which for 1889 was 250,000 carats.

*Corundum* or emery stone is freely distributed among the crystalline rocks of Southern India, as in Travancore, Mysore, Hyderabad, and the districts of Coimbatore, Salem, Anantapur, and North Arcot. An immense deposit exists near Pipra and Kadopani in South Rewa. One hundred and six tons are said to have been

quarried during the year, in the Anantapur and Coimbatore districts of Madras, and one hundred and eight tons in the Mysore State.

*Manganese ores* are well developed at Gosalpur in the Jabalpur district of the Central Provinces: also to some small extent in the Belgaum, Dharwar, and Ratnagiri districts of the Bombay Presidency: yet again in Vizianagram, and in the Bellary districts of Madras.

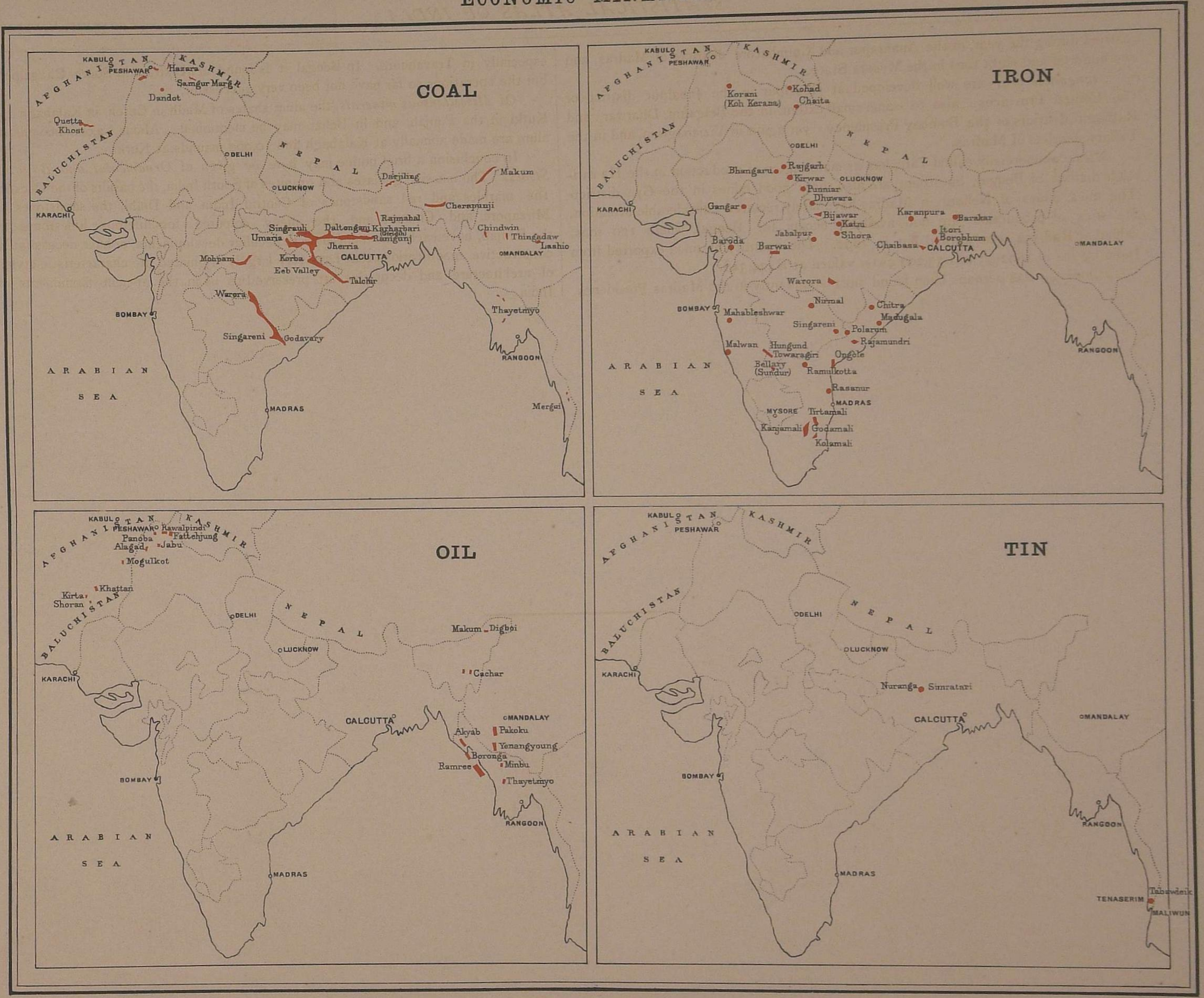
*Mica*, commercially called Talc, has its main region of production in the Hazaribagh district of Bengal, but there are also three good mines in the Gya district. The mica mines of Nellore in Madras have lately received considerable attention. Statistics of production are not available except for Bengal, where 120 tons, valued at R98,154, were turned out in 1892. The quantity of mica exported from India by sea in 1892-93 was 33,292 cwts. valued at R434,348.

*Plumbago* has perhaps been found most abundantly in the Madras Presidency, especially in Travancore. In Bengal it is found at Kaktrara in South Bhagalpur, but the operations so far have not been very successful.

Of *Miscellaneous minerals*, the alum shales of Madh in Cutch, in Kalabagh and Kutki in the Punjab, and in Behar may be mentioned. About 12,000 maunds of alum are made annually at Kalabagh and 10,000 maunds at Kutki.

In conclusion a brief notice may here be given of *Ornamental and Building Stones*. The massive gneisses and granites of South India, the basalts of the Deccan, the marbles and red sandstones of Central India and Delhi, the sandstones of Mirzapore and Chunar, and the many coloured fossilliferous limestones of the Punjab, have each lent themselves to peculiar developments, or have necessitated constructive modifications that have very largely originated the characteristic styles of architecture and decorative art preserved to us in the ancient monuments of India.

# ECONOMIC MINERALS

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# CHAPTER X.

# RAILWAYS.*

Of the railway lines in India, part have been constructed with a view to the development of trade, part for the protection of areas subject to famine, and part again for military purposes. Many lines of course meet two or more of these objects, but as a rule each line has been laid down in obedience to a fixed course of policy having one of these three objects especially in view.

The *development of the commercial wants of the country* has been effected, as elsewhere, by the construction primarily of large trunk lines and next of feeder lines subsidiary to these.

It was Lord Dalhousie who during his tenure of office as Governor General (1848—1856) sketched out the great trunk lines needed for the development of Indian resources. His schemes included the connection of Calcutta with Peshawar, of Bombay with Agra on the one side and with Madras on the other, and of Madras with the western seaport of Calicut; and these large projects have in the end, though after considerable delay, been now fully carried out. To them have from time to time been added other important trunk lines, such as that from Lahore to Karachi, which was started in Lord Dalhousie's time, and that from Rangoon to Mandalay which was commenced in 1881 and completed in 1889 under the auspices of Lord Dufferin and Lord Lansdowne.

The map below indicates the manner in which the main systems are subserved by important subsidiary lines, such as the Oudh and Rohilkhand (1864—1887), the South Indian Railway (1859—1874), and the Northern Bengal Railway (1874—1878), or by cross-connections, such as those between Agra and Bandikui, or Ajmere and Khandwa. The larger Native States have been especially helpful in promoting railway extension of this nature, Baroda being first in the field, but followed gradually by the Chiefs of Kattiawar and Rajputana, and by the rulers of Hyderabad, Indore, Gwalior, and other States.

Railways also serve a double purpose in connection with the *famines* which from time to time afflict large tracts of country in India. In the first place the construction of railways is useful (though, from the amount of high mechanical skill involved, not so useful as some other classes of work) as a means of employing the population from whom the famine has withdrawn a means of livelihood; and some important lines such as the line from Darbhanga to the Ganges and the Dhond-Manmad line which connects the two arms of the Great Indian Peninsula Railway were originally undertaken as works of famine relief. But a further and more important object is secured by railways which are constructed with a view to bringing into contact with commercial centres the tracts which are liable to famine, and the systematic construction of such railways owes its origin to the recommendations put forward by the Royal Famine Commission of 1878—1880, which placed before the Government a well-considered scheme for supplying India with railways specially designed for equalising the distribution of food stocks in years of local scarcity. The mileage considered necessary by the Commission for security was 20,000 miles, against which there were in India on 30th June 1893, 20,395 miles completed or in hand, and the last great line which finds a place in the Famine Commission's recommendations, *viz.*, that which is to run along the East Coast from Madras to Calcutta, is now well in hand, so that it may be said that the protective system of Indian railways is now practically complete.

The value of railways for *military* purposes had of course been understood from the first, but it was not until the Afghan war of 1878 that the importance from a military point of view of rapidly completing the system received practical recognition. Since that date the Indus has been bridged at Sukkur, and the Lahore-Karachi line has been put in direct connection by rail with the outlying post of new Chaman on the Afghan border; the North Western Railway has been pushed on from Jhelum to Peshawar and has been brought by branch and loop lines into touch with the frontier cantonments of Kohat, Dehra Ismail Khan, and Dehra Ghazi Khan, and it has been arranged to complete the last link of the long line that forms the direct route from Attock down the frontier to Karachi.

The financial arrangements of the various lines are based on one or other of three main lines of policy. The earlier railways were all made by Companies to which the Government guaranteed a minimum rate of interest and from 1850 to 1869 the 'guaranteed' system was the only one in force. The costliness of the arrangements led to a reaction, and between 1869 and 1879 the policy in favour was one of construction by the State. The large establishments however and the pecuniary liabilities entailed by State-construction induced the Government of Lord Ripon to initiate a combination, or concurrent employment, of the two systems previously in vogue, and this policy, elaborated in some cases by peculiar varieties in the arrangements made between Government and the Companies, is that which has been since pursued.

With some trifling exceptions the Indian railways are constructed on one or other of two gauges, the standard gauge of 5 feet 6 inches and the metre

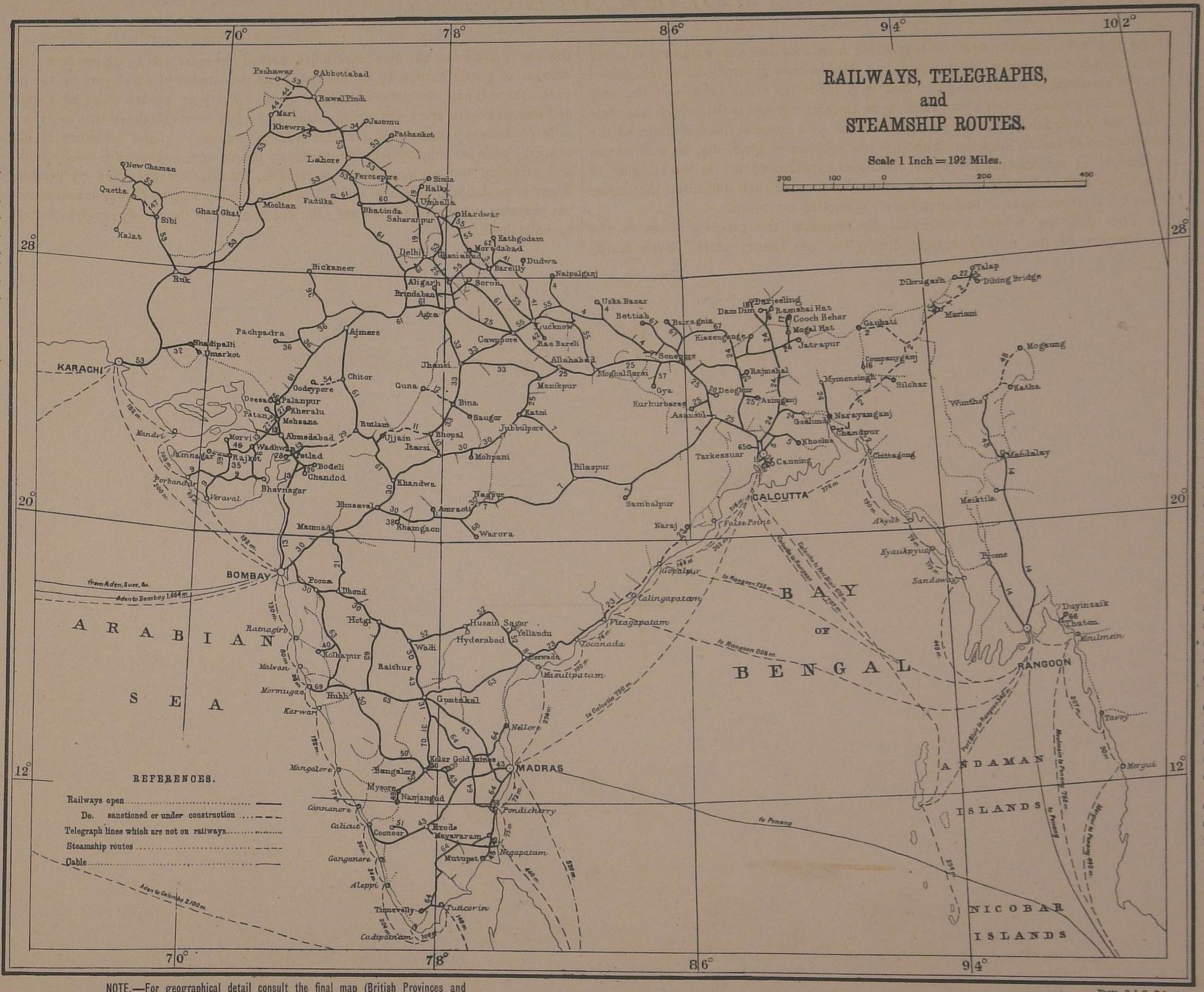
* The following brief description is based partly on a paper on "The rationale of railways in India" read by Sir T. Hope, K.C.S.I., before the Society of Arts in 1890, and partly on information supplied by Mr. F. B. Hebbert, Under-Secretary to the Government of India, in the Railway Branch of the Public Works Department.

gauge of 3 feet 3⅜ inches, and the respective merits of the two gauges has given rise at times to considerable controversy. It has now generally been recognized that the standard or broad gauge is that best fitted for trunk lines, and the only important trunk line in India now running on the metre gauge is that which connects Delhi and Ahmedabad. It may be noted here as a general characteristic of the construction of Indian lines that, although the problem of gradients, so well known in Europe, is not absent, the chief difficulties experienced are in the bridging of wide rivers with shifting beds and it is on the conquest of such difficulties that some of the greatest triumphs of Indian railway engineering are based.

The diagram below is intended to represent the progress made in the development of the railway system during the last twenty years. Even during the last twelve years the number of miles worked has increased by 93 per cent., the amount of goods carried by 98 per cent., and the number of passengers by 142 per cent.: there is now one mile of railway open to every 88 square miles of country and one station to every 613 square miles, and it has been calculated that every new mile of railway constructed, besides adding indirectly to the resources of the country, provides employment for about 15 people and, as these are chiefly adults and probably the working heads of families, directly benefits some 75 persons. There is no doubt ample room for still further development in railway construction, but the map and diagram below are sufficient evidence of the steady progress hitherto maintained.

RAILWAY.

1. Amráoti.
2. Assam-Bengal.
3. Bareilly-Rampur-Moradabad.
4. Bengal and North-Western (Company's Section).
5. Bengal Central.
6. Bengal Dooars.
7. Bengal-Nágpur.
8. Bezwada extension.
9. Bhávnagar-Gondal-Junágarh-Porbandar.
10. Bhopal-Itársi.
11. Bhopal-Ujjain.
12. Bina-Guna.
13. Bombay, Baroda, and Central India.
14. Burma (State).
15. Calcutta Port Commissioners'.
16. Cherra Companyganj.
17. Cooch Behar.
18. Darjeeling-Himalayan.
19. Delhi-Umballa-Kalka.
20. Deoghur.
21. Dhond-Manmád.
22. Dibru-Sadiya.
23. East Coast (State).
24. Eastern Bengal (State).
25. East Indian.
26. Gaekwar's Dabhoi.
27. Gaekwar's Mehsána.
28. Gaekwar's Petlád.
29. Godhra-Rutlam.
30. Great Indian Peninsula.
31. Guntakal-Mysore Frontier.
32. Hyderabad-Umarkot.
33. Indian Midland.
34. Jammu and Kashmir.
35. Jetalsar-Rájkot.




NOTE.—For geographical detail consult the final map (British Provinces and Native States) which can be pulled out so as to lie alongside this Map.

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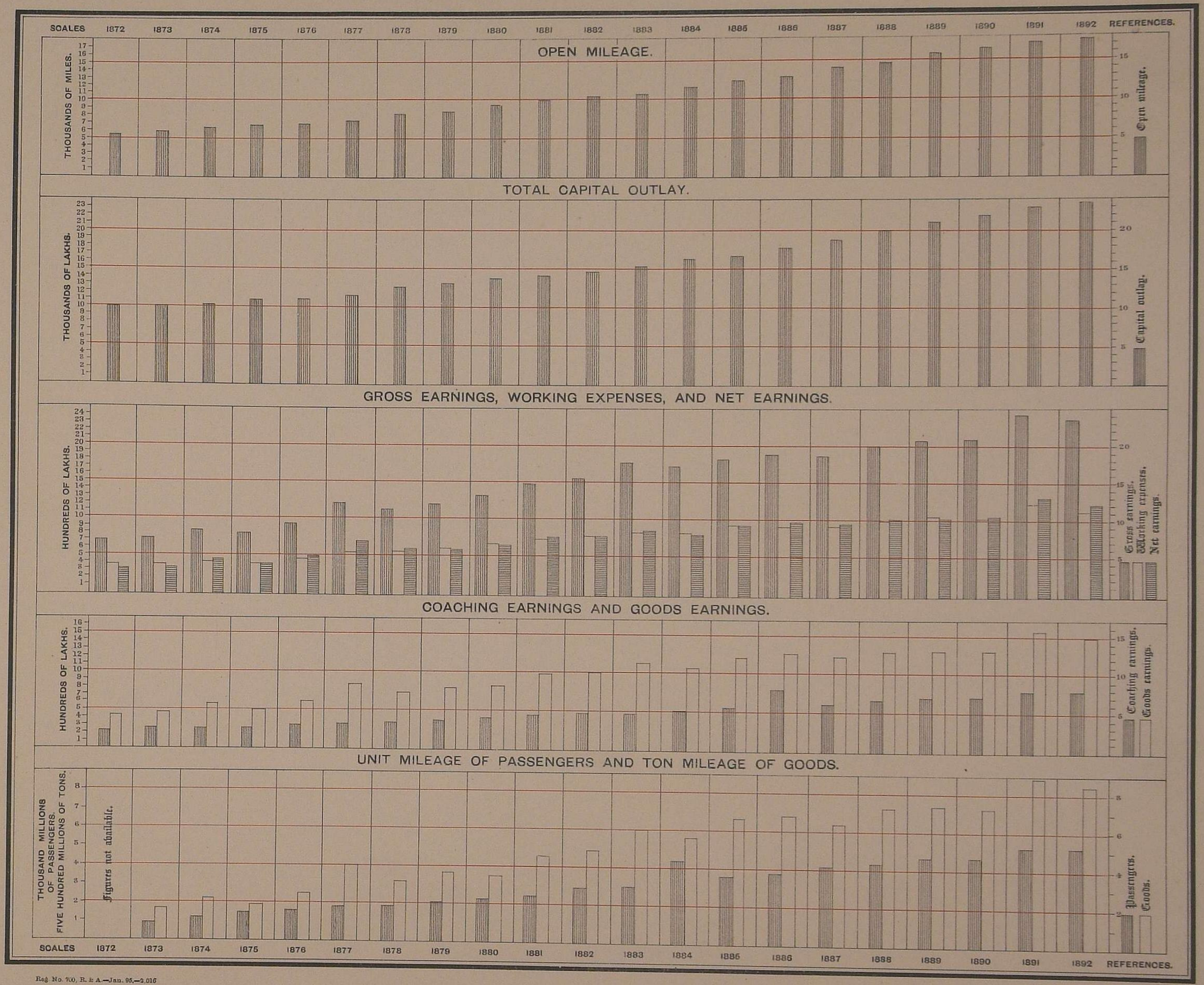
RAILWAY.

36. Jodhpore-Bickaneer.
37. Jorhát.
38. Khamgáon.
39. Kolar Gold-fields.
40. Kolhápur.
41. Lucknow-Bareilly Section, R. & K. Railway.
42. Lucknow-Rae Bareli Section, O. & R. Railway.
43. Madras.
44. Mári-Attock.
45. Máyavaram-Mutupet.
46. Morvi.
47. Mushkaf-Bolán.
48. Mu Valley.
49. Mysore-Nanjangúd.
50. Mysore Section, Southern Mahratta Railway.
51. Nilgiri.
52. Nizam's Guaranteed State.
53. North-Western (State).
54. Oodeypore-Chitor.
55. Oudh and Rohilkhand (State).
56. Pálanpur-Deesa.
57. Patna Gya.
58. Pondicherry.
59. Rájkot-Jamnagar.
60. Rájpura-Bhátinda.
61. Rajputana-Malwa.
62. Rohilkhand and Kumaon Company's Section).
63. Southern Mahratta.
64. South Indian.
65. Tarkessuar.
66. Thaton Duyinzaik.
67. Tirhoot Section, Bengal and North-Western Railway.
68. Wardha Coal.
69. West of India Portuguese.
70. Yesvantpur-Mysore Frontier.

# DIAGRAM ILLUSTRATING PROGRESS OF CONSTRUCTION, CAPITAL EXPENDITURE, AND MAIN RESULTS OF TRAFFIC WORKING OF THE RAILWAYS IN INDIA FROM 1872.

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Litho., S. I. O., Calcutta.

# CHAPTER XI.

# PRICES.

IN this paper wholesale and retail prices are treated separately. For the former there are no records for the interior of the country, and the returns are confined to certain important articles in the foreign import and export trade, the prices given being their prices at the ports. For retail prices tolerably complete returns are in existence for all parts of the country for the principal food-grains and salt since 1861. For both wholesale and retail prices it has been considered expedient, for the sake of clearness, to refrain from stating actual prices, and to confine attention to the fluctuations above and below a certain datum-level based on the average prices of a particular period.

The figures are all taken from the latest issue of the annual publication entitled *Prices and Wages in India* issued by the Finance and Commerce Department of the Government of India.

*Wholesale Prices.*

The datum-level for these is the price in March 1873, that time having been selected as the commencement of the great change which has been proceeding for twenty years in the relative value of gold and silver.

The following table shows the variation in prices since then of the principal imports into Calcutta, the prices of March 1873 being taken to represent 100:—

| | Grey shirtings, 8¼ lb. | Mule twist, grey yarn, Banner mills, No. 40. | Mule twist, Turkey red, No. 40. | Copper, sheathing. | Iron, flat, bolt, etc. | TOTAL. |
|---|---|---|---|---|---|---|
| March 1873 | 100 | 100 | 100 | 100 | 100 | 500 |
| June 1874 | 97 | 92 | 106 | 95 | 108 | 498 |
| March 1875 | 86 | 92 | 102 | 103 | 93 | 476 |
| " 1876 | 86 | 90 | 92 | 99 | 79 | 446 |
| January 1877 | 78 | 90 | 85 | 92 | 67 | 412 |
| " 1878 | 73 | 78 | 87 | 86 | 60 | 384 |
| " 1879 | 76 | 75 | 78 | 80 | 56 | 365 |
| " 1880 | 81 | 84 | 75 | 83 | 73 | 396 |
| " 1881 | 82 | 82 | 69 | 81 | 56 | 370 |
| " 1882 | 78 | 84 | 69 | 89 | 71 | 391 |
| " 1883 | 82 | 74 | 54 | 80 | 60 | 350 |
| January 1884 | 75 | 74 | 62 | 77 | 62 | 350 |
| " 1885 | 76 | 72 | 58 | 64 | 54 | 324 |
| " 1886 | 84 | 67 | 57 | 57 | 50 | 315 |
| " 1887 | 81 | 62 | 57 | 65 | 53 | 318 |
| " 1888 | 79 | 75 | 59 | 90 | 61 | 364 |
| " 1889 | 81 | 75 | 57 | 98 | 65 | 376 |
| " 1890 | 76 | 74 | 57 | 69 | 79 | 355 |
| " 1891 | 74 | 70 | 56 | 71 | 62 | 333 |
| " 1892 | 74 | 64 | 57 | 72 | 64 | 331 |
| " 1893 | 77 | 74 | 61 | 80 | 97 | 389 |
| " 1894 | 70 | 69 | 62 | 83 | 94 | 378 |

The articles selected represent about one-third of the total import trade in value, but their prices represent the course of prices of more than half the whole trade. For the variations in the price of grey shirtings represent not only the variations in the price of unbleached but also those in bleached and coloured cotton goods, and the price of iron is also an indication of the price of steel, hardware, machinery, and railway material. The half of the trade which is represented by the selected articles is also the portion which most closely and intimately concerns the people at large; for the remaining half to a great extent consists of articles which are either not primary necessities, or do not enter into general consumption except by Europeans, or are consumed in such small quantities as to have no material importance in the domestic economy of the people.

It appears from this table that since 1873 the price of imports generally has fallen 22 per cent., and that of cotton goods and yarns by about 30 per cent. The fall in copper and iron is much smaller, but the prices of these two articles have fluctuated greatly during the period, and though they have risen in the last two years, they were in 1892 about as low in level as the other articles in the table, and it is probable that there will be another relapse from the temporary increase.

The following is a statement of the prices of the principal articles of Indian exports, the prices in March 1873 being here also taken to represent 100:—

| | Cotton, Broach. | Cotton yarns, 20s. | Rice, moonghy. | Wheat No. 1, soft white. | Opium (Bengal) | Indigo, good. | Jute, picked. | Gunny bags. | Linseed, fine, bold, clean. | Tea. | TOTAL. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| March 1873 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 1000 |
| January 1874 | 88 | 100 | 150 | 75 | 105 | 114 | 153 | 88 | 115 | 123 | 1111 |
| ,, 1875 | 80 | 81 | 128 | 80 | 96 | 109 | 126 | 111 | 108 | 123 | 1042 |
| ,, 1876 | 85 | 80 | 111 | 84 | 96 | 91 | 141 | 84 | 90 | 136 | 998 |
| ,, 1877 | 87 | 90 | 150 | 93 | 97 | 110 | 150 | 95 | 102 | 148 | 1122 |
| ,, 1878 | 84 | 80 | 155 | 119 | 97 | 88 | 153 | 101 | 106 | 135 | 1118 |
| ,, 1879 | 78 | 74 | 189 | 116 | 87 | 114 | 153 | 99 | 109 | 129 | 1148 |
| ,, 1880 | 98 | 81 | 136 | 115 | 94 | 112 | 169 | 89 | 113 | 126 | 1133 |
| ,, 1881 | 95 | 85 | 89 | 96 | 109 | 105 | 156 | 111 | 104 | 135 | 1085 |
| ,, 1882 | 90 | 80 | 83 | 97 | 102 | 117 | 137 | 118 | 91 | 126 | 1041 |
| ,, 1883 | 78 | 74 | 101 | 87 | 91 | 107 | 96 | 98 | 85 | 110 | 927 |
| ,, 1884 | 85 | 74 | 142 | 86 | 93 | 117 | 162 | 106 | 96 | 116 | 1077 |
| ,, 1885 | 90 | 72 | 142 | 74 | 99 | 103 | 110 | 94 | 98 | 90 | 972 |
| ,, 1886 | 81 | 72 | 130 | 80 | 93 | 107 | 137 | 85 | 101 | 96 | 982 |
| ,, 1887 | 85 | 69 | 103 | 89 | 83 | 70 | 137 | 98 | 101 | 77 | 912 |
| ,, 1888 | 95 | 74 | 110 | 86 | 80 | 82 | 153 | 125 | 95 | 84 | 984 |
| ,, 1889 | 93 | 79 | 131 | 95 | 94 | 93 | 192 | 126 | 112 | 77 | 1092 |
| ,, 1890 | 95 | 74 | 144 | 84 | 86 | 76 | 197 | 118 | 109 | 63 | 1046 |
| ,, 1891 | 84 | 70 | 147 | 87 | 79 | 86 | 126 | 93 | 97 | 81 | 950 |
| ,, 1892 | 75 | 65 | 162 | 103 | 79 | 74 | 236 | 132 | 112 | 71 | 1109 |
| ,, 1893 | 107 | 78 | 189 | 95 | 96 | 114 | 192 | 119 | 128 | 87 | 1205 |
| ,, 1894 | 84 | 71 | 170 | 80 | 84 | 108 | 241 | 109 | 123 | 52 | 1122 |

Here there has been a general increase at the rate of about 12 per cent. in 1894 compared with 1873, while in imports there was, as has been seen already, a fall of about 22 per cent. But, on examination of the variations in the price of each article, it appears that the increase is due in great measure to three articles—rice, jute, and linseed, most of the other articles having either fallen or but slightly increased.

*Retail Prices.*

If we take the course of wholesale prices at the ports to fairly represent the course of the prices obtained for his produce by the producer, it is evident that in most cases he receives either a lower price or a but little higher price than in 1873, rice, jute, and seeds being excepted. But if this is the case, the retail consumer of food-grains has had abundant reason to complain in recent years of their increasing price. The following tables give the variations in the prices of the four principal food-grains in the provinces in which they are most largely produced and consumed. The variations are based upon the level of prices in the five years 1871—75, that level being taken to represent 100. That was a period of normal prices, the only disturbance in them being that which was occasioned by the scarcity in Behar in 1874. It did not, however, disturb general prices elsewhere materially, and as the period coincides with the beginning of the great divergence in the relative values of gold and silver, it is a more suitable period to select than any other.

*Rice.*

| | 1861-65. | 1866-70. | 1871-75. | 1876-80. | 1881-85. | 1886-90. | 1891. | 1892. | 1893. |
|---|---|---|---|---|---|---|---|---|---|
| Burma | 117 | 116 | 100 | 140 | 128 | 139 | 153 | 181 | 154 |
| Assam | 84 | 112 | 100 | 138 | 109 | 126 | 140 | 168 | 197• |
| Bengal | 82 | 102 | 100 | 121 | 104 | 119 | 137 | 172 | 168 |
| Madras | 118 | 136 | 100 | 142 | 106 | 116 | 136 | 155 | 144 |

*Wheat.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| North-Western Provinces and Oudh | 81 | 109 | 100 | 105 | 96 | 117 | 136 | 136 | 128 |
| Panjab | 93 | 128 | 100 | 121 | 102 | 126 | 147 | 162 | 135 |
| Bombay | 113 | 135 | 100 | 136 | 92 | 104 | 111 | 134 | 115 |
| Central Provinces | 96 | 161 | 100 | 130 | 103 | 143 | 168 | 208 | 164 |

*Jawar.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| North-Western Provinces and Oudh | 80 | 96 | 100 | 96 | 82 | 117 | 148 | 112 | 108 |
| Panjab | 87 | 125 | 100 | 118 | 92 | 125 | 155 | 144 | 114 |
| Bombay | 137 | 133 | 100 | 148 | 97 | 113 | 111 | 127 | 122 |
| Madras | 116 | 133 | 100 | 160 | 99 | 112 | 137 | 171 | 158 |

*Bajra.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| North-Western Provinces and Oudh | 79 | 96 | 100 | 98 | 85 | 113 | 143 | 113 | 110 |
| Panjab | 86 | 129 | 100 | 117 | 97 | 131 | 154 | 157 | 126 |
| Madras | 113 | 134 | 100 | 153 | 99 | 111 | 137 | 172 | 152 |

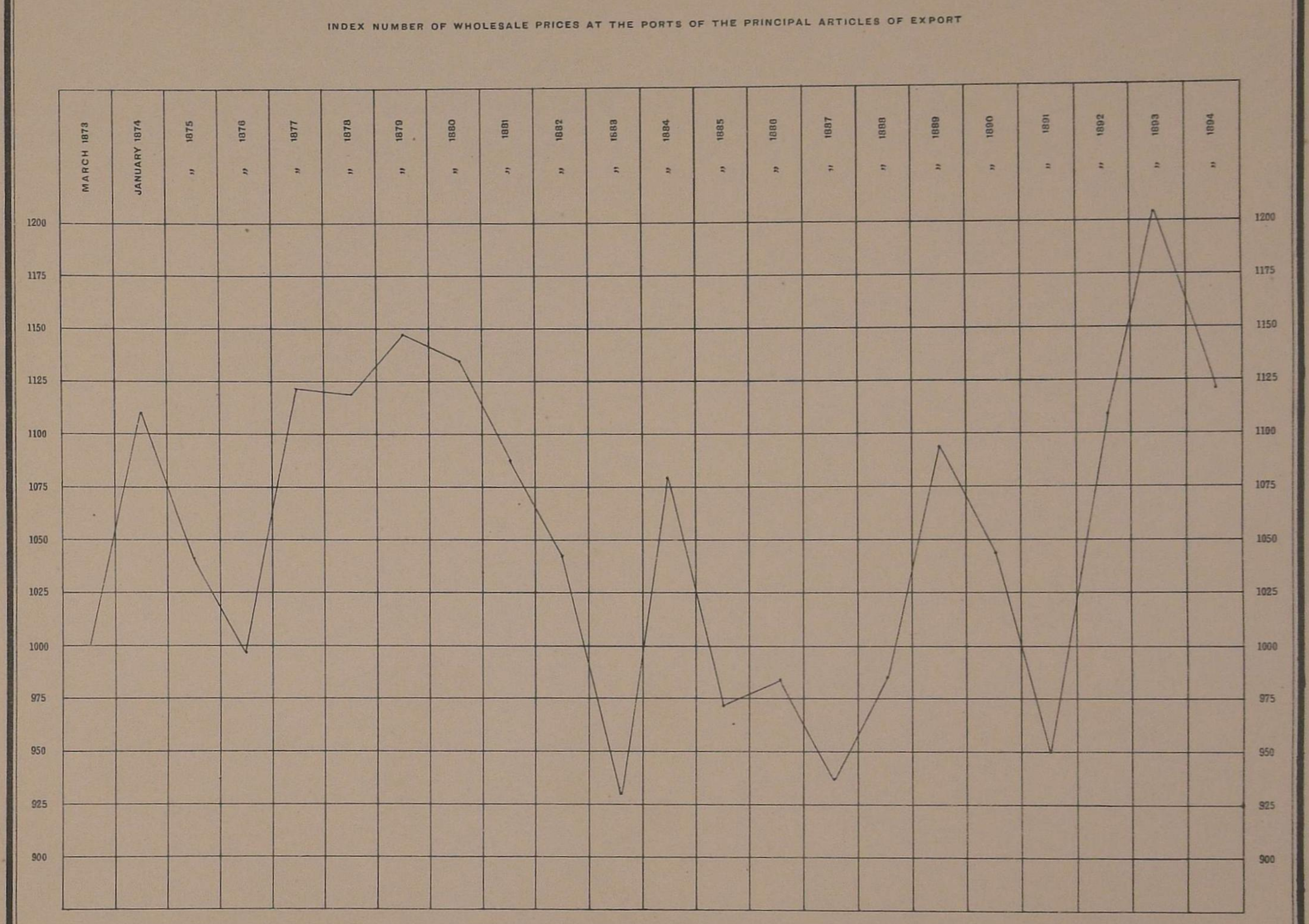
To those who are acquainted with the agricultural history of India a glance at the foregoing figures and at the diagrams at the end of this paper will show how largely the variations of prices in these food-grains are the results of seasonal vicissitudes. The period 1866—70 included the great famine of 1866 in Eastern India and the famine of 1869 in Northern India. The period 1877—80 included the great famine of 1877—79 in Western and Southern India. In 1892 again there was prolonged drought in several districts of Madras as well as in some other parts of India. These occurrences are reflected in the figures and diagrams. It will be observed that the rise of prices is never confined to the tracts comprising the actually distressed area. In most cases drought extends to an area of varying width beyond the tracts most intensely affected, and supplies for that area, as well as for the tracts suffering from complete failure of crops and actual famine, are required on a large scale from still more distant regions which have supplies to spare. Practically, experience shows that the occurrence of a great famine over a considerable area has the effect of raising the level of prices more or less all over the continent.

Until about 1885 it may be said that the general normal level of prices, taking the average of 1871—75 as that level, had not on the whole moved up. Since then, however, there has been a very marked upward movement, and during the last decade prices generally have ranged far above the datum-level of 1871—75, the increase being represented for rice at from 40 to 60 per cent., for wheat at much the same rate, and for jawar and bajra at from 20 to 40 per cent. It is not the case,

therefore, that the rupee has maintained its purchasing power, as has been so frequently asserted; on the contrary, its purchasing power has largely declined. This high level of prices is certainly not the result of insufficient harvests, for during the decade the crops have been on the whole good, such local failures as there have been here and there not having been of sufficient importance to affect more than a very limited area. Nor is it the consequence, as some have asserted, of large exports of food-grains to foreign countries, for wheat is the only article in which there has been an expansion of the trade and, such as it is, cultivation and production have expanded in more than equal proportion to the trade. It would as yet be premature to connect the rise of prices with the expansion of the currency in recent years when silver has been coined in great and apparently unnecessary quantity; for, though there is certainly an intimate connection between prices and the currency that connection is very obscure, and time must be allowed to elapse before it can be said with any confidence that the rise of prices which has been coincident with the great expansion of the currency in the last ten years has also been the result of that expansion. If in the next few years the gradual contraction of the silver currency which will follow from the closure of the mints should be accompanied by a fall of prices not explicable by other causes, then strong ground will be furnished for the inference that the loss in the purchasing power of the rupee which has been so marked a feature in the retail prices of the last decade is due to the condition of the currency. There has in fact been a material fall in prices since June 1893 when the mints were closed. But it is certain that sufficient time has not yet been given for any appreciable contraction of the currency, and it is reasonable to assign the fall in prices to the low prices—the lowest indeed on record—ruling in Europe for wheat and rice, which are the two grains exported from India in large quantity. A heavy fall in the price of these would naturally re-act on the price of the inferior grains when there are abundant supplies of the latter on hand.

There are two other points of interest to be noted in the course of retail prices. *First*, the influence of the extension of railways and other means of communication in the last decade is very marked in the general levelling up of prices all over the country and the assimilation of the level in each province. In former years, with the season not unfavourable generally, low prices in one place were not infrequently coincident with high prices in another not remote; but as the railways have extended all over the country, and as communications by sea have been rendered easy and cheap by the general introduction of steamers in the coasting trade and the construction of docks and harbours, the tendency is more and more to a uniform level of prices throughout the country. *Second*, the level of prices in the last three years has been as high as, and in some cases higher than, the level which in former years was regarded as famine level. Yet these three years were not marked by any extraordinary pressure or strain on the people, except in Madras in 1892, and even there the pressure was as nothing in comparison with the pressure of the famine period of 1877—79. It is reasonable to draw the inference from this fact that the general condition of the people has so greatly improved that they are able to live and thrive under a range of prices which in former years would have indicated that the point of destitution and starvation had been reached. This inference is confirmed by the range of wages which have increased on the whole in at least as great a proportion as prices.

# PRICES




NOTE.—The index number has been constructed from the prices at the exporting ports of ten staple articles viz: cotton, cotton yarn, rice, wheat, opium, indigo, jute, gunny bags, linseed, and tea. The price of each article in March 1873 is taken to represent 1000

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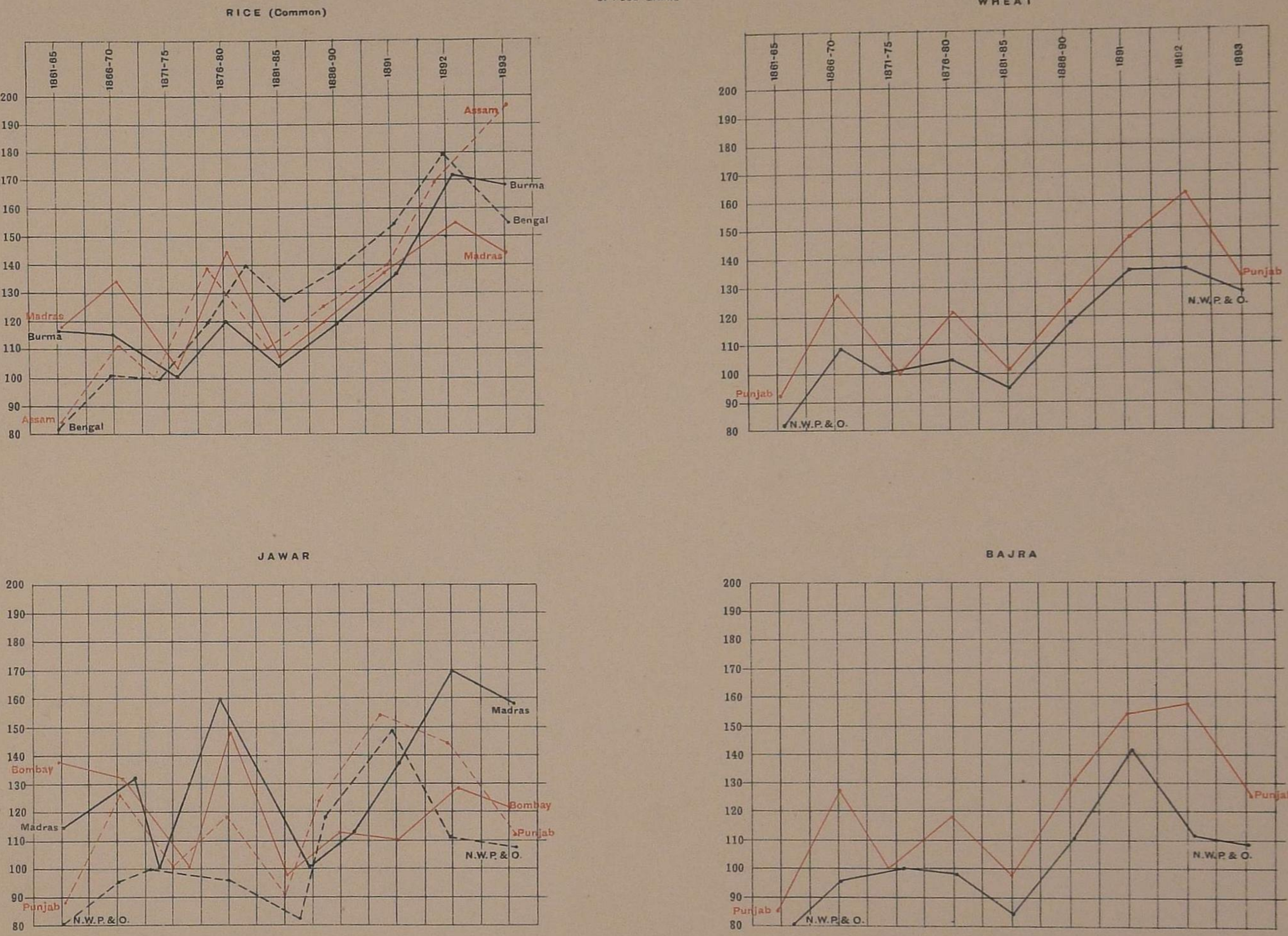
# PRICES

RETAIL PRICES

of Food Grains




NOTE.—These diagrams illustrate the course of retail prices of the four Principal food grains of India in the provinces in which each forms a staple product and article of food. The prices in the period 1871-75 are taken on the datum level and=100.

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Photo., S. I. O. Calcutta.

# CHAPTER XII.

# FOREIGN TRADE.

THE Foreign Trade of India is mostly carried on by sea, but there is also a smaller trade carried across the land frontiers of the Empire into and from the neighbouring countries. The trade carried by sea and that carried by land will be treated separately in this chapter.

## Trade by Sea.

The foreign trade of India by sea in the last official year, ending on 31st March 1894, amounted in value to Rx. 202,854,540,* of which Rx. 92,382,213 represented the value of imports, both merchandise and treasure, while the exports, including re-exports, of merchandise and treasure, amounted to Rx. 110,472,327. A large excess of exports over imports is an unvarying feature in the trade statistics of India, explained by the fact that India is a debtor to England for capital lent, and has also to remit considerable sums to England yearly for the cost of military and civil administration, for furlough pay and pension to officers on leave or retired from the service, and much of the savings of a great many of the Europeans, official and non-official, living in India. Last year (1893-94), as a consequence of the closure of the Indian mints to the coinage of silver for the public, the excess was very much below the average, being only Rx. 18,090,114.

The progress of the Indian foreign trade for the last quarter of a century will be apparent from the following figures, which include treasure as well as merchandise and also Government transactions:

| | | Imports. Rx. | Exports. Rx. |
|---|---|---|---|
| 1. Five years ending | 1873-74 | 41,301,100 | 57,842,995 |
| 2. " | 1878-79 | 48,221,855 | 63,134,626 |
| 3. " | 1883-84 | 61,813,743 | 80,410,066 |
| 4. " | 1888-89 | 75,134,300 | 90,277,643 |
| 5. " | 1893-94 | 88,695,933 | 108,667,097 |

The excess of exports over imports for the previous five years had averaged about Rx. 22,891,600 annually, while the drawings of the Secretary of State in Council Bills for the same period averaged Rx. 22,813,200 annually, which may be taken to be the cost to India of the interest on the debt she has accumulated, and of the other items mentioned above. With the progress of the fall in exchange in recent years this cost has greatly increased.

The trade of India with the world, in the interchange of merchandise, was thus distributed in 1893-94:

| | Rx. |
|---|---|
| With Europe | 127,232,811 |
| With Africa and the adjacent islands | 9,087,008 |
| With Asia | 36,093,039 |
| With America | 6,724,435 |
| With Australia | 1,267,254 |

The trade with gold-standard countries is about 77 per cent., and the trade with silver-standard countries 23 per cent. of the whole.

Of the trade with Europe as much as 68 per cent. is conducted with the United Kingdom, the trade with that country representing nearly half (48 per cent.) of India's trade with the world. The proportion was much larger in former years, but in recent years it has gradually fallen (though there has been an absolutely great increase in the volume of the trade) as a result of the development of direct intercourse with Continental countries in supersession of the indirect trade with them which was carried on by way of the United Kingdom. But though the trade with Continental countries—France, Germany, Belgium, Austria-Hungary, Italy—has greatly increased, it is still small when compared with the trade with the United Kingdom, and that country continues to be India's largest customer, whether as a producer and consumer or as an agent for distribution. Most of the cotton yarn and piece-goods, the woollens and silks, the coal and the salt, the metals, machinery, and railway plant, which form the bulk of the import trade, comes from England.

It has been said above that an important feature in the trade statistics is the large normal excess of exports over imports. Another striking feature is the continued absorption of the precious metals. The flow of gold and silver into India is unintermittent. The total net imports of these metals—that is, after deduction made of the quantities again exported—amounted during the last twelve years to Rx. 155,392,600, the average annual net imports of gold having been Rx. 3,025,460, and of silver Rx. 9,924,000. The great increase in the last three years of the silver price of gold has caused a restriction in the imports of gold and has stimulated the imports of silver. The gold is all hoarded, and to a large extent converted into ornaments for the persons of the wives and children of the owners. Though there is some evidence that the practice of hoarding is not so great as it was in former times, it is in this form that the native of India still to a large extent prefers to keep his savings secure from the vicissitudes of political changes and from the rapacity which traditionary experience of former oppressive governments taught him to associate with the officials of the State—a conviction which has not even yet departed from him. Until the closure of the mints in June 1893 the silver was mostly coined into rupees at the mints, though it did not all remain in currency, for a material proportion of the rupees went to the silver-smith to be worked up into ornaments. Since the closure of the mints this practice has ceased, and bar silver has taken the place of rupees for manufacture into ornaments.

The bulk of the foreign trade (about 95 per cent. of it) is concentrated in the five principal ports of the country, Bombay, Calcutta, Madras, Rangoon, and

* NOTE.—Transactions on account of Government are not included in these figures. These transactions consist mainly in the importation of stores—arms and ammunitions of war, railway and telegraph material, clothing material for the troops, machinery and metals, stationery and paper, and other stores. The total value of Government transactions in 1893-94 was Rx. 3,231,709. They may be taken to average from Rx. 3,000,000 to Rx. 3,500,000.

Karáchi, about 78 per cent. flowing in and out of Bombay and Calcutta. The value of the imports and exports of merchandise at these ports in 1893-94 was:

| | Rx. |
|---|---|
| Calcutta | 69,927,146 |
| Bombay | 67,999,093 |
| Karáchi | 11,040,337 |
| Rangoon | 10,799,556 |
| Madras | 10,303,973 |

The general character of the import trade has, with few exceptions, remained substantially unchanged for many years. The bulk of the imports consists of cotton piece-goods and yarns, liquors, metals (chiefly copper, iron, steel and tin), hardware and cutlery, machinery, railway material, woollen and silk goods, mineral oil and mineral dyes, coal, raw silk, sugar, salt, and spices. There has been an enormous increase in the imports of mineral dyes and mineral oil, which bid fair to supersede entirely the use of indigenous vegetable dyes and oils. The importation of the coarser descriptions of cotton yarns and cotton cloths has also gradually diminished to a very low point, the locally manufactured articles of similar descriptions having taken their place. The importations of cotton yarns and cotton cloths now are confined to the medium and finer qualities, the former not being made in any considerable quantity and the latter not at all in the Indian mills. The industrial development of India is making steady progress, especially in two lines, the manufacture of cotton and of jute. The cotton spinning and weaving industry is chiefly concentrated in the Bombay Presidency, where are located 94 out of the total number of 136 mills, while the jute manufacturing industry is practically confined to Calcutta and its neighbourhood. The cotton mills of India now employ 29,362 looms and 3,538,577 spindles, and the jute mills 9,590 looms and 192,688 spindles. The capital invested in cotton mills and jute mills, so far as they are worked on the jointstock principle, is Rx. 11,598,300 for the former and Rx. 3,427,400 for the latter.

The re-export trade of India is comparatively very limited, its value amounting to only about 6 per cent. of the value of the merchandise received from foreign countries. There may be perhaps some 4 per cent. more sent across the land frontiers. Broadly, quite 90 per cent. of the imports are consumed in India itself. The re-export trade is carried on mainly at Bombay, which is a convenient depot between Europe and the coasts of Arabia, Persia, and Africa.

The exports of Indian produce and manufactures were valued last year at Rx. 102,015,615. While the largest part of the import trade consists of manufactured goods, nearly half of them being cotton cloths and yarns, the bulk of the export trade consists of food-stuffs and raw material for manufacture, the principal items being:

*Food-stuffs:* wheat and wheat-flour, rice, tea, sugar, coffee, spices;

*Raw material:* cotton, jute, oilseeds (linseed, rapeseed, til or sesame, poppy and others), hides and skins, teakwood, wool;

*Goods partly manufactured:* cotton yarn, vegetable oil (castor and cocoanut), saltpetre, raw silk, tanned hides and skins;

*Goods fully manufactured:* cotton piece-goods, grey and coloured, bags and sacks of jute, shell lac, silk piece-goods;

*Dyes, tans, drugs, and narcotics:* Opium, indigo and other dyes.

The carriage of the foreign trade of India gives employment to a very large quantity of shipping tonnage. In 1893-94, the number of vessels which entered and cleared at Indian ports from and to foreign countries amounted to 9,995, the total tonnage being 7,665,886. Of these vessels 3,927, with a burden of 6,152,966 tons, were steamers, steamer tonnage thus representing as much as 80 per cent. of the whole. For the most part the vessels carrying the Indian foreign trade fly the British flag, these representing about 82 per cent. of the whole.

The figures in the tables appended show the increase of the import and export trade in the principal articles of merchandise exchanged between India and other countries during the last decade.

## Table I.—Imports.

| Articles. | | 1884-85. | | 1893-94. | |
|---|---|---|---|---|---|
| | | Quantity. | Value. | Quantity. | Value. |
| | | | Rx. | | Rx. |
| Cotton piece-goods, grey | yds. | 1,138,343,726 | 12,276,501 | 1,314,037,764 | 15,995,911 |
| ,, ,, white | ,, | 277,875,450 | 3,698,470 | 393,129,691 | 5,538,086 |
| ,, ,, coloured | ,, | 315,345,829 | 4,720,184 | 422,320,035 | 7,015,426 |
| Cotton yarn | ℔ | 44,799,637 | 3,360,420 | 42,806,991 | 3,108,941 |
| Metals | tons | 236,201 | 4,843,733 | 283,057 | 6,278,592 |
| Machinery and millwork | | ... | 1,484,124 | ... | 2,518,038 |
| Railway material | | ... | 1,592,620 | ... | 1,242,977 |
| Hardware and cutlery | | ... | 844,552 | ... | 1,301,690 |
| Coal and coke | tons | 708,560 | 1,204,341 | 555,263 | 972,563 |
| Mineral oil | gallons | 27,306,999 | 1,158,222 | 86,608,568 | 3,275,585 |
| Silk piece-goods | yds. | 12,080,177 | 1,264,648 | 16,418,727 | 1,758,658 |
| ,, raw | ℔ | 1,831,702 | 747,563 | 2,947,595 | 1,360,179 |
| Woollen piece-goods | yds. | 10,700,128 | 1,002,312 | 15,054,352 | 1,422,971 |
| Liquors | gallons | 2,310,976 | 1,217,921 | 4,249,174 | 1,458,204 |
| Provisions | | ... | 1,103,321 | ... | 1,782,868 |
| Apparel | | ... | 948,930 | ... | 1,578,049 |
| Sugar | cwt. | 1,616,874 | 2,140,838 | 2,127,905 | 2,824,190 |
| Salt | tons | 412,839 | 649,233 | 412,876 | 791,067 |
| All other articles | | ... | 8,891,378 | ... | 13,732,962 |
| TOTAL VALUE | | ... | 53,149,311 | ... | 73,956,957 |

## Table II.—Exports.

| Articles. | | 1884-85. | | 1893-94. | |
|---|---|---|---|---|---|
| | | Quantity. | Value. | Quantity. | Value. |
| | | | Rx. | | Rx. |
| Cotton, raw | cwt. | 5,066,057 | 13,286,367 | 4,788,888 | 13,296,670 |
| ,, yarn | ℔ | 65,897,183 | 2,441,101 | 134,066,243 | 4,974,133 |
| ,, piece-goods | yards | 47,908,513 | 813,753 | 72,714,980 | 1,173,698 |
| Opium | cwt. | 118,599 | 10,882,606 | 97,910 | 8,019,428 |
| Oilseeds | tons | 912,534 | 10,745,203 | 1,211,467 | 16,753,251 |
| Rice | ,, | 1,102,577 | 7,192,198 | 1,232,911 | 10,388,633 |
| Wheat | ,, | 791,588 | 6,309,140 | 607,828 | 5,193,885 |
| Jute, raw | cwt. | 8,368,686 | 4,661,368 | 8,690,133 | 8,524,130 |
| ,, manufactures | | ... | 1,543,870 | ... | 3,441,787 |
| Hides and skins | cwt. | 1,010,578 | 4,934,340 | 849,955 | 5,801,328 |
| Indigo | ,, | 154,629 | 4,068,900 | 131,399 | 4,182,128 |
| Tea | ℔ | 64,162,055 | 4,044,759 | 126,332,475 | 6,585,835 |
| Coffee | cwt. | 328,317 | 1,245,506 | 278,735 | 2,002,171 |
| Wool, raw | ℔ | 18,928,173 | 713,576 | 24,248,636 | 1,079,772 |
| All other articles | | ... | 7,430,521 | ... | 10,598,766 |
| TOTAL VALUE | | .. | 80,313,208 | ... | 102,015,615 |

**Table III.—Value of Trade (in merchandise) with principal countries in 1893-94.**

| Countries. | Imports therefrom. | Exports thereto. |
|---|---|---|
| | Rx. | Rx. |
| United Kingdom | 52,001,013 | 34,643,102 |
| China | 3,542,556 | 11,129,322 |
| France | 1,138,262 | 10,694,311 |
| Germany | 1,714,003 | 7,618,508 |
| Belgium | 2,053,276 | 5,726,972 |
| Straits Settlements | 2,524,623 | 4,842,139 |
| United States | 2,016,270 | 3,359,821 |
| Austria-Hungary | 1,371,383 | 2,949,448 |
| Italy | 448,572 | 3,574,420 |
| Ceylon | 696,625 | 3,220,039 |
| Egypt | 171,372 | 3,722,627 |
| Mauritius | 1,787,030 | 1,330,660 |
| Persia | 734,205 | 1,837,120 |
| Russia | 1,263,014 | 665,327 |
| Australia | 242,665 | 1,024,588 |
| Other Countries | 2,252,088 | 10,079,186 |
| Total | 73,956,957 | 106,447,590 |

## Frontier Trade.

The trade which crosses the land frontiers of India is as yet of no special importance, the whole value of the imports and exports last year amounting to less than Rx. 7½ millions. This trade has to contend with great difficulties. The routes in many places lead across the highest mountain chain in the world, and, while trying enough at the best, they are made impracticable by snow for more than half the year. In other places they are caravan tracks across barren deserts, or paths cut through primeval forest and malarious jungle; and, whether they pass over desert or jungle, the trader is often subject not only to the risks and difficulties placed in his way by nature, but to the attacks of freebooters and savages who regard the peaceful trader as lawful prey. At almost all points of the frontier, moreover, the trader has to pay heavy customs duties imposed by the rulers of the trans-frontier States.

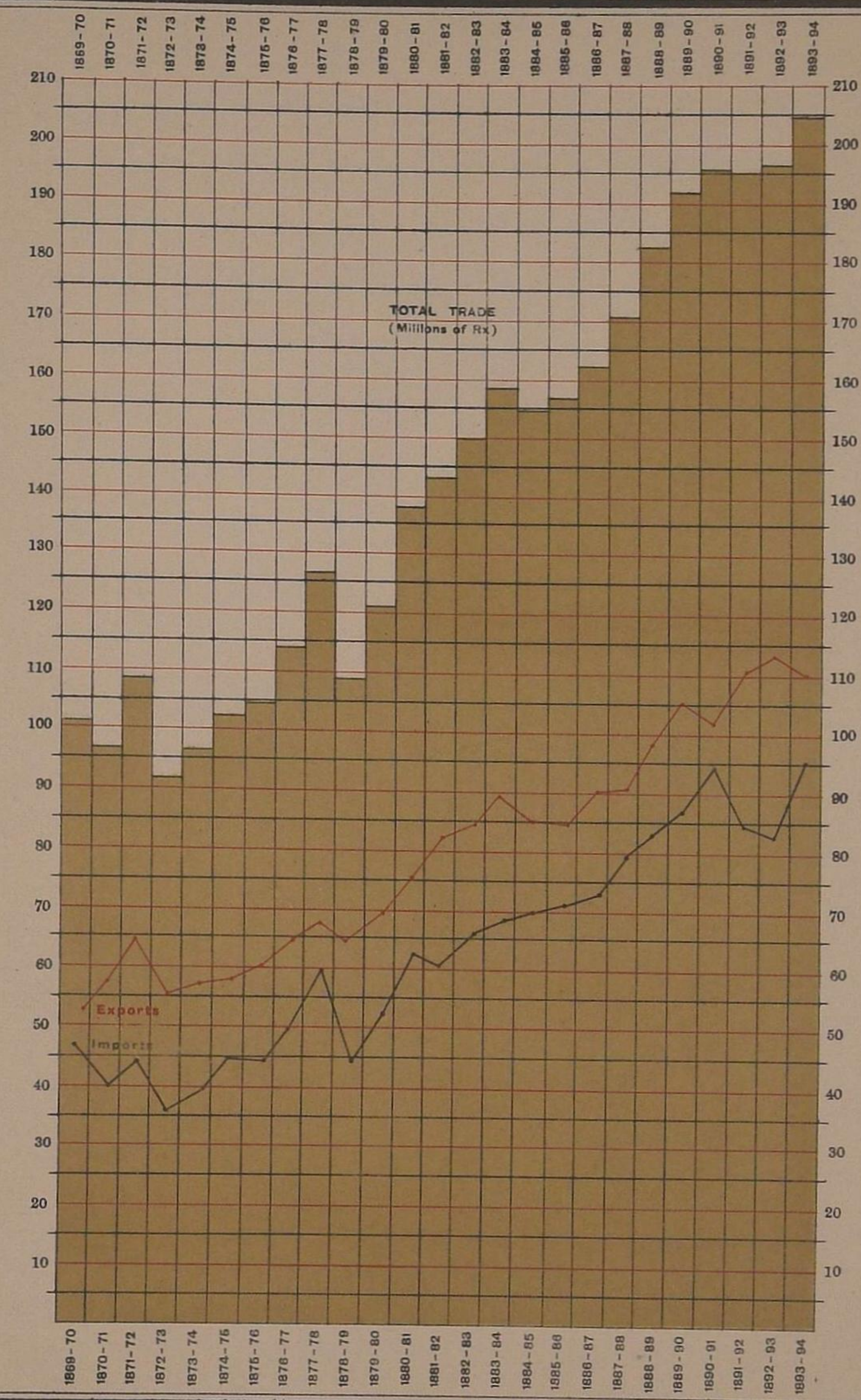
The land frontier stretches over an immense line from Karachi in the extreme west to the most south-easterly point in British Burma, Mergui. Over this vast line of frontier the current of trade flows, very unequally in its various channels, between India and Beluchistan, Afghanistan, Kashmir, Tibet, Nepal, Sikhim, Bhutan, the Eastern mountain country (the home of the savage tribes known as Abors, Mishmis, Daphlas, Nagas, Lushais), Western China, the Karen and Shan Country, and Siam. There are only a few points in the line where trade is really safe or is in possession of routes which lend themselves to future development. These are (1) the railway which has now been pushed beyond Quetta, (2) the road through the Khyber leading into Northern Afghanistan, (3) the roads into Kashmir and (4) into Nepal, and (5) the great Irawadi route, now supplemented by the railway for the greatest part of the distance, which leads to Western China. Even on these routes the development of trade is much retarded by the sudden cessation of good roads at the British frontier and by the exactions to which traders are subjected by the States beyond the border. Thus the trade with Afghanistan would make rapid progress if it were not impeded by Russian fiscal policy which shuts out Indian goods from the Central Asian markets, as well as by the heavy dues levied by the Amir of Afghanistan. The strict commercial restrictions imposed by the Nepalese durbar and by the officials in Tibet (the latter not appreciably modified as yet by the recent Trade Convention concluded with China) hamper trade with those countries; and the character of the tribes in the mountainous region on the Burma frontier, and the exactions of the Chinese officials, have so far prevented that development of trade with Western China which was reasonably hoped for and anticipated. Considering the natural difficulties of the trade routes, the great distances to be traversed, the cost of transport, and the general poverty of the inhabitants of the regions beyond the Indian frontiers, it would be sanguine to anticipate within any measurable period such a development of trade as would make its value assume real importance when compared with the value of the foreign trade carried by sea.

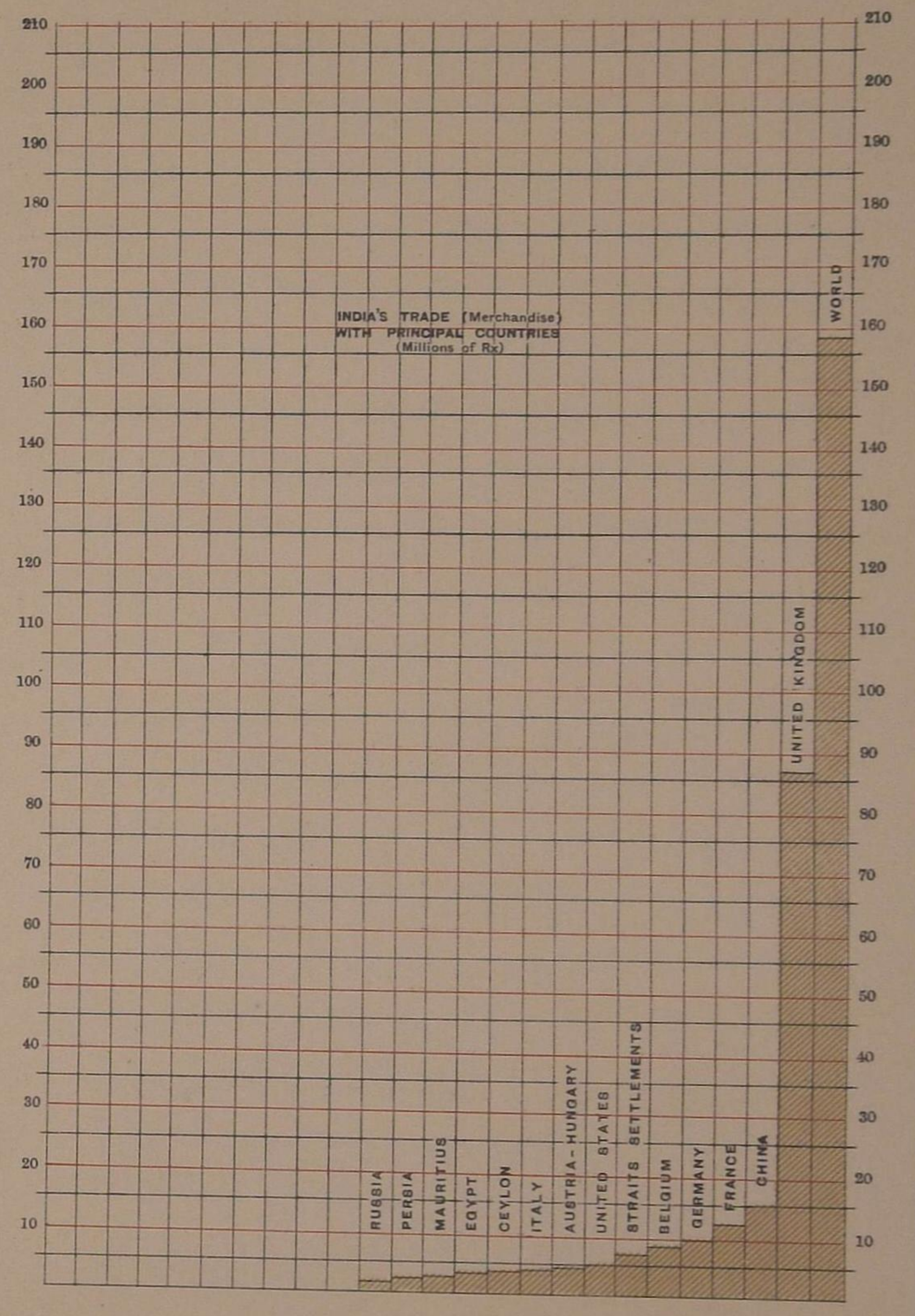
The bulk of the trade consisted in 1893-94 of the export from India of cotton yarn and piece-goods, metal-ware, tea (to Kabul and Kashmir), grain and pulse, cotton (raw), provisions, salt, sugar, silks and woollens, spices, tobacco, indigo, and other dyes. The imports were largely cattle, food-grains, ghi, timber (from Kashmir and the countries bordering on Burma), horses, fruits, wool (raw), hides, seeds, and drugs. It is impossible to obtain anything like a correct account of the interchange of gold and silver.

The table appended shows the value of the trade in 1893-94 with the principal countries on the other side of the Indian frontiers:—

| | Imports into British India. | Exports from British India. |
|---|---|---|
| | Rx. | Rx. |
| Southern Afghanistan and Baluchistan | 529,642 | 496,802 |
| Kabul (including Tirah and Bajaur) | 345,921 | 629,472 |
| Kashmir | 422,888 | 528,708 |
| Tibet | 124,616 | 60,721 |
| Nepal | 1,493,012 | 1,104,374 |
| Western China | 137,216 | 134,157 |
| Karennee | 214,025 | 20,719 |
| Zimmé | 230,172 | 86,442 |
| N. and S. Shan States | 313,131 | 238,063 |
| Siam | 82,219 | 41,475 |
| Other Countries | 144,526 | 90,723 |
| Total | 4,037,368 | 3,431,656 |

# TRADE

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# TRADE

## EXPORTS

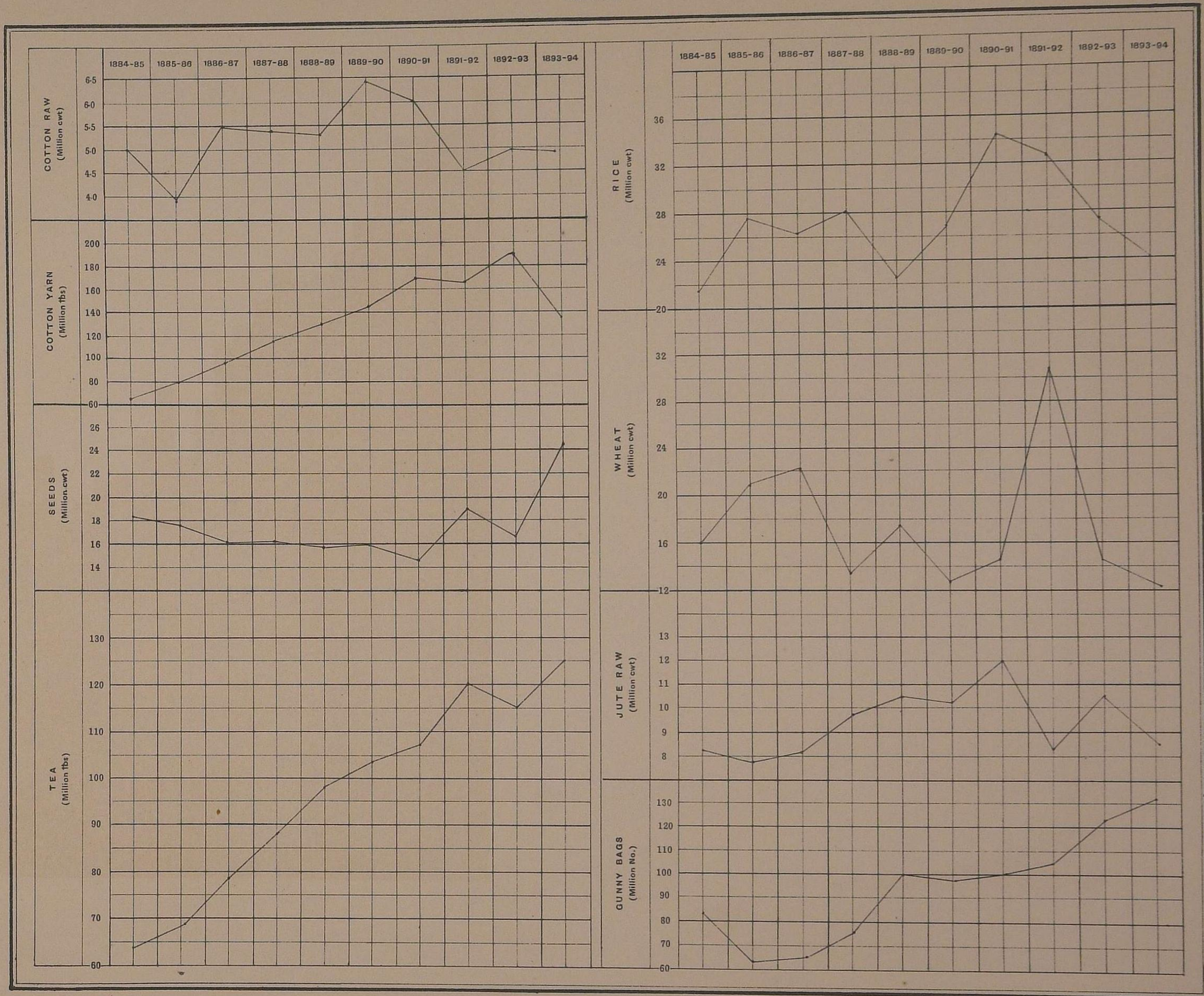


Photo. S. I. O., Calcutta.

# CHAPTER XIII.

# FINANCE AND TAXATION.

UNTIL after the suppression of the mutiny of 1857 the financial system of India was lax and crude to a degree, and the fiscal régime, inherited in the main from our native predecessors, was so inefficient in character and in practice as to greatly obstruct the development of trade and industrial enterprise. For the whole of the first half of the century moreover the administration was engaged in a constant succession of military enterprises, which were required to aid native States in pursuance of treaty obligations against other native States, or to repel the aggression of native States against the British advance, or to fight marauders and invaders like the Rohillas, the Mahrattas, the Pindaris, the Gurkhas, the Burmese. Expedition after expedition resulted in the aggrandisement of the Company's territory by the annexation of native States, and as each was annexed the heavy expenditure incurred on the military side was followed by heavy expenditure on the civil side for the provision of the newly acquired territory with European administrative machinery and the apparatus of civilised administration. The revenues from the annexed territory were augmented only by degrees, while the expenditure, being necessary to justify our removal of the native Governments which had done nothing for the country under their rule, was immediate. The financial consequence was that expenditure was constantly greater than revenue, and that a large amount of debt was incurred.

Then came the mutiny, the suppression of which tried to the utmost the whole energy of the Government and involved enormous expenditure. Immediately following the restoration of order the work of reconstruction had to be begun, and the Government found itself in a position of terrible embarrassment. It was evident that the old lax system and methods must be replaced by a radically improved administration of the exchequer, and that large additions to the revenue were imperative. The work was begun by a reform of the financial system and administration under Mr. James Wilson, who was sent out from England, as Finance Minister, to devise and introduce a new system based on the English financial system. He has been succeeded to the present time by Minister after Minister, specially charged with the control of the finances, some of them sent out from England like Mr. Wilson, others selected from the Indian Civil Service. Mr. Wilson found it necessary to impose heavy taxation which was in the nature of war taxation; but with the complete restoration of order it became possible to reduce taxation to moderate limits, the taxes yielding sufficient, under the new and judicious methods of administration which were introduced, to keep the budgets in equilibrium. Progress was rudely interrupted, however, in 1866 by the Orissa famine, and in 1869 by the famine in the North-Western Provinces. Thereafter further progress was made until it was again interrupted by the small but costly famine in Behar in 1873, the great famine in Western and Southern India in 1877, and the campaigns in Afghanistan in 1879 and 1880. Meanwhile also a further, and what has since proved to be the most serious and permanent, cause for financial anxiety arose in the divergence in the relative values of gold and silver which began in 1873, and has continued in an increasing degree to the present day. The Government of India have always had to remit large sums to England on account of army charges, for the supply of military and other stores, for the furlough and pensionary allowances of its European officials, and for interest on debt. These obligations had in themselves an inevitable tendency to increase, and as the rupee fell in exchange value the burden of the cost of remittance became increasingly greater. A still further reason for anxiety was created by the fall in the price of Indian opium resulting from the increasing competition of Chinese grown opium. The measures taken to restrict the expenditure on the one hand, and to increase the revenue on the other by increased taxation, brought about an equilibrium in 1881-82, of which advantage was taken in the following year to reduce taxation. The period of surplus lasted, however, for only three years, for there came in 1884 an apprehension of war with Russia, arising out of a collision between the Russians and the Afghans at Panjdeh, and large military expenditure, temporary and permanent, was incurred on that account and on account of the occupation of Upper Burma in 1885, again turning the surplus into a deficit. There were recurring deficits from 1884-85 to 1887-88, and the restoration of equilibrium was effected only by increased taxation imposed in 1886 and 1888. The additional revenue thus secured, and a stringent reduction of expenditure, together with some unforeseen and accidental circumstances, gave not only equilibrium, but considerable surpluses from 1888-89 to 1891-92, when the occurrence of another heavy fall in exchange combined with the increased military expenditure to again reverse the financial position. For the last three years there have been heavy deficits, to meet which further increased taxation has become necessary. The mints were closed in June 1893 to the unrestricted coinage of silver for the public in view to the ultimate adoption of a gold standard, and it was hoped that the closure would prevent the further fall of the exchange value of the rupee; but the measure has not as yet had the effect anticipated, and the position is still unstable and insecure.

Looking at the Accounts of Revenue and Expenditure for the last fifteen years, we find a deficit in 1880-81, of Rx. 3,631,394.* In the following three years, 1881-82 to 1883-84, there was a surplus each year, amounting in the aggregate to Rx. 6,149,995. In the two following years there were deficits aggregating Rx. 3,188,172. Then came a small surplus of Rx. 178,427, followed by a heavy deficit of Rx. 2,028,832.

* Rx. = tens of rupees.

Additional taxation was imposed, and there followed four years of surpluses (1888-89 to 1891-92), aggregating Rx. 6,804,757. This period of surpluses was succeeded by three years of deficits (1892-93 to 1894-95), aggregating Rx. 2,928,112.

Altogether, during the fifteen years there have been seven years in which the expenditure has been in excess of the revenue, and eight years in which the revenue has exceeded the expenditure. The aggregate surplus was Rx. 13,133,179 and the aggregate deficit Rx. 11,776,510. Unfortunately the surpluses were only obtained as the result of additional taxation imposed in 1886, in 1888, and in 1889, or as the result of unforeseen and temporary improvements in the opium revenue or in exchange. The deficits on the other hand came with each new fall in exchange. During all this period the Government found it possible only in one year (1882) to relieve the tax-payer.

Since 1880-81 the debt in India has been increased from Rx. 85,959,746 to Rx. 105,546,078, the increase being Rx. 19½ millions. The debt in England also has increased, and in much larger ratio, from £71,429,133 to £114,113,792, the increase amounting to £42·68 millions. Much the largest proportion of this debt, however, was raised for the construction of railways and other productive public works. In the last fifteen years the capital expenditure on railways and irrigation works alone has amounted to over Rx. 54 millions, and the aggregate capital expenditure on State railways from the beginning amounts to Rx. 143 millions, and on major irrigation works to over Rx. 30 millions.

The credit of the Government has been gradually improving. Until 1823 it was unable to borrow at less than 6 per cent.; in that year it borrowed at 5 per cent., and in the following year the rate of interest offered and accepted fell to 4 per cent. In the stress of the mutiny the Government had to increase the rate to 5½ per cent. By 1859 the 6 per cent. loans were all converted and paid off; by 1872 the 5 per cent. loans, and by 1879 the 5½ per cent. loans, were similarly disposed of. The 4½ per cent. loans were reduced to 4 per cent. in 1892, and in 1893 the Government issued a small loan by way of experiment at 3½ per cent. The experiment was a success, and was followed in 1894 by the conversion of the 4 per cent. loans to 3½ per cent., a measure which saves about half a million Rx. annually in interest charges. The interest on the Indian sterling debt in England has similarly been reduced from 5 and 4 to 3½ per cent., the conversion having been effected in 1889. The whole Indian debt in India and in England now stands at 3½ per cent. and the paper is at a premium.

During the last quarter of a century there has been a great development of what is known as the system of Provincial Finance. Until 1870 the whole of the revenues of the country were taken into the general treasury, and the wants of the Local Governments were met as occasion arose by grants from that treasury of the specific sums required for any purpose. This system became unworkable. The Local Governments had no responsibility in financial matters, while they were held fully responsible for the efficient conduct of the local administration. There was no incentive to local economy; and, as new occasions arose for expenditure, each Local Government put its demand before the Supreme Government quite regardless of the means at the command of the latter. The greater the pressure put upon the Supreme Government for the supply of funds the greater was the probability of obtaining them, and it eventually became impossible to secure effective financial control under the centralised system prevailing. When this fact was finally recognised, a new system was devised under which the Provincial Governments were made responsible for the expenditure on certain services and were assigned the necessary sums for their maintenance, these sums being based on the average expenditure incurred on the services. When the amount of the grant in any case was more than sufficient for the service the Local Government was allowed to apply the surplus to other Provincial Services; and in order to supplement insufficient assignments, and to provide for the growing expenditure following on administrative improvements, each Government was authorised to impose provincial rates and cesses, the proceeds of which were retained in the provinces in which the rates and cesses were levied. In course of time this system has greatly expanded beyond the dimensions of its first beginnings. Most of the administrative services have now been provincialised as regards the expenditure incurred on them, and the Local Governments are allotted the revenues under each head of service in varying proportions Each Local Government prepares its annual budget of provincial revenue and expenditure, with the restrictions (1) that a certain minimum balance must always be maintained, and (2) that expenditure is subject to the control of the Government of India in certain respects. The arrangements or agreements made with the Local Governments—commonly but erroneously known as "contracts"—are revised every five years. Under the existing agreements the provincial share of revenue and expenditure under each principal head of revenue and expenditure is as follows :—

| | Revenue. | Expenditure. |
|---|---|---|
| Land Revenue . . | one-fourth . . | the whole. |
| Salt and Customs . . | rents, fines, fees, etc. (not the duty), | varies—the whole in some provinces, none in others |
| Stamps . . . | three-fourths . . | three-fourths. |
| Excise . . . | one-fourth . . | one-fourth. |
| Provincial rates and cesses . . . | the whole . . | the whole. |
| Assessed taxes<br>Forests<br>Registration | half . . . | half. |
| Law Courts, Prisons, Police, Marine, Education, Medical, Stationery, Scientific Departments. | the whole . . | the whole |
| Civil Works . . | the whole . . | the whole |

The arrangements are in fact more elaborate and intricate than is indicated by the foregoing statement, but it serves to show generally the nature of the arrangements and the lines on which they proceed.

As it may be of some interest to show the proportions in which the revenue is raised and expenditure incurred in the different provinces, the following figures, giving the figures for 1891-92, are appended (Rx.) :—

| | Revenue. | Expenditure. (charged to Revenue). |
|---|---|---|
| Bengal . . . . | 19,838,779 | 8,975,445 |
| Bombay . . . . | 13,197,611 | 8,764,194 |
| Madras . . . . | 11,368,003 | 9,391,621 |
| North-Western Provinces and Oudh . . . . | 11,042,660 | 5,154,384 |
| Panjab . . . . | 7,871,588 | 4,833,685 |
| Burma . . . . | 5,084,872 | 3,914,774 |
| Central Provinces . . | 2,350,356 | 1,460,481 |
| Assam . . . . | 1,039,358 | 749,494 |
| India General . . . | 16,980,133 | 22,519,754 |

With the single exception of opium all the principal heads of revenue have largely increased during the period since 1880-81, which has been taken as the starting point of this paper, the increases under each head being as follow :—

| | | | |
|---|---|---|---|
| Land Revenue | + | 21·7 | per cent. |
| Opium | – | 39 | ,, |
| Salt | + | 21·2 | ,, |
| Excise | + | 70 | ,, |
| Stamps | + | 40·3 | ,, |
| Customs | + | 13·1 | ,, |
| Assessed taxes | + | 211·5 | ,, |
| Provincial rates | + | 27 | ,, |
| Registration | + | 82·5 | ,, |
| Forests | + | 131·9 | ,, |
| Post Office | + | 56·5 | ,, |
| Railways | + | 116·2 | ,, |
| Telegraphs | + | 82·8 | ,, |

The total revenue in these fifteen years has increased by about 17¾ millions of Rx., or at the rate of 23·8 per cent.; and the total expenditure has increased by about 14⅓ millions of Rx., being at the rate of 18·4 per cent. The expenditure has really increased at a more rapid rate than appears from these figures, for the first year of the period was one in which heavy war expenditure was incurred on account of the Afghan campaign. A very large proportion of the increase in expenditure is due to the loss by exchange on the drawings of the Secretary of State. In 1880-81 the average rate of exchange for Council Bills was a shade under 20*d.*; in 1894-95 it was taken at 14*d.* The Council Bills in 1894-95 amount to seventeen millions sterling, equivalent to Rx. 29,143,000; if the rate of exchange had been maintained at 20*d.* the equivalent would have been only Rx. 20,400,000, the difference being as much as Rx. 8¾ millions. The greater part of the remainder of the increased expenditure is to be ascribed to the increased military charges. In fact, but for the fall in exchange and the increase in military expenditure it would have been possible for the Indian Government to materially reduce taxation during this period instead of increasing it. It would indeed have been possible to do this even with the increase which has occurred in military charges if the fall in exchange had not absorbed the increased revenue.

The taxes levied in India may be grouped under two heads: General and Local or Municipal. The second need not be noticed in this paper. All the taxes and tolls levied by local bodies, such as municipalities, cantonments, port trusts, are expended in the local area in which they are levied.

Some portion of the general taxes—namely, that which is collected as Provincial rates and cesses—is applied to public purposes in the provinces in which the taxes are levied. But though, as before pointed out, the proceeds of provincial taxation are, with the assignments made from imperial revenue, placed at the disposal of the Local Governments for provincial expenditure, it has been necessary, under financial stress, for the Imperial Government on three occasions to levy contributions from the Provincial Governments by reducing the allotments made to them under the quinquennial agreements, and taking for imperial purposes a portion of the provincial balances.

The proceeds of general taxation are derived from (1) the land revenue, (2) opium, (3) salt, (4) stamps, (5) excise, (6) customs, (7) the income tax, (8) registration, and (9) provincial rates and cesses.

It is a disputed question whether the land revenue should be regarded as a tax, or as a rent paid to the State as owner of the land. For present purposes it must be regarded as a tax, for the money taken from the people under this head constitutes as much as 28 per cent. of the aggregate revenue of the State from all sources. The assessments on the land are revised at various periods, the term varying ordinarily from ten to thirty years, except in the provinces where a permanent settlement exists. Its increase is, in the nature of the case, relatively slow.

The revenue from Opium is derived partly from the proceeds of the State monopoly, and partly froma tax imposed on every chest of opium grown in the native States of Central India and Rajputana when brought into British India for export by sea or for consumption in British territory, the duty being at a higher rate in the latter case. In the former case the tax is a transit duty, the object of which is to equalise the position in China of opium grown in the native States and in British territory. In the second case the tax is an import duty which is countervailed by the excise duty on British-grown opium. An excise is also levied on opium cultivated under license in the Panjab and in Upper Burma, and an import duty is levied on all opium imported by land or by sea. This revenue has been declining for some years past, owing mainly to the increasing competition of the cheaper and inferior Chinese drug.

As with Opium, so with Salt, the State possesses a monopoly of the production. Private manufacture is allowed under license, and local production is supplemented by the import of foreign salt by sea into Bengal and Burma, about 70 per cent. of the whole being produced in India. Varying rates of duty were levied on salt until 1878, when measures were taken to assimilate the rate everywhere. The general rate of R2½ per maund was reduced in 1882 to R2, but was again raised in 1888 to R2½, and at the same time the rate in Burma, which had been three annas, was raised to one rupee. These are the rates at which duty is now levied, except in the Panjab trans-Indus districts, where, for political reasons, a low rate is levied. The salt revenue increases steadily with the growth of population, and is now considerably larger than the opium revenue.

The Stamp revenue is derived from judicial (court-fee) and non-judicial stamps, the revenue from the former being about double that from the latter. The revenue from postage and telegraph stamps is credited under the heads of Post Office and Telegraphs, not under Stamps. The stamp duties have not been increased, or materially modified, since 1870 for judicial and 1879 for non-judicial stamps. The revenue, however, has largely increased.

The Excise revenue is derived from duties imposed upon spirits, beer, intoxicating drugs, and opium consumed in India, the taxes being imposed at varying rates in the different provinces. Much the largest proportion of the revenue is obtained from spirits, and most largely in Madras, Bombay, and Bengal. The increase in the revenue is chiefly due to increased rates of duty and improved administration in Madras and Bombay.

The Customs revenue is obtained from duties on imports from foreign countries and from a duty of three annas a maund on the export of rice. The rates of import duty have varied from time to time. The general rate was ten per cent. from 1859

to 1864, when it was reduced to $7\frac{1}{2}$ per cent., a further reduction to 5 per cent. being made in 1875. From that year onwards the tariff underwent a gradual process of disintegration and destruction until it was repealed in 1882, with the exception of the special duties on arms, liquors, opium, and salt. In 1888 financial necessity required the imposition of an import duty on petroleum, and in 1894, under further financial stress, the tariff of 1875 was practically re-established, with the important exception that cotton piece-goods were exempted from duty. This exemption was however removed by further legislation in December of the same year.

Under Assessed Taxes the revenue is obtained from the income-tax, which, after many modifications in form and substance since 1860, and a temporary discontinuance at one period, was imposed in its present form in 1886 to meet the deficit caused in 1885 by increased military expenditure and the fall of exchange. It took the place of a license-tax on trades and professions which was levied provincially. That tax produced in the last year of its existence Rx. 503,034 and the income-tax produced in the first year of its existence Rx. 1,354,735. During the nine years of its operation the revenue has increased $28\frac{1}{2}$ per cent., partly no doubt as the result of increasing prosperity, but also materially as the consequence of improved administration of the tax. Salaries of military officers not exceeding 500 rupees monthly, and the incomes of all other persons which do not exceed 500 rupees annually, are exempt; and taxable incomes are assessed at five pies in the rupee on annual incomes of 2,000 rupees and more, and at four pies in the rupee on incomes of lower amounts. There are various exemptions, chief among them being incomes derived from agricultural sources, because these pay land revenue and provincial rates and cesses.

The revenue obtained from Registration fees is comparatively small. While registration is compulsory for certain classes of instruments to give them validity, it is voluntary for other large classes of instruments.

The revenue from Provincial rates is derived from district local funds, provincial cesses on the land, cesses for village servants and accountants, and other cesses, the largest proportion of the revenue being obtained from the first item. The revenue has increased mainly as the result of additional taxation.

The total revenue from all these heads of taxation amounts to only Rx. 58,745,000, the aggregate revenue of the State amounting to Rx. 92,024,900, the revenue from taxation being thus less than 64 per cent. of the whole revenue. The incidence on the people, taking the population of British India at 221,258,681 (the figures of the census of 1891) falls at the rate of Rupees 2 annas 10 pies, 5·7 per head. It is really, however, lower than this, for a portion of the opium, salt and customs import duties falls on the population of the Feudatory States, but it is impossible to show statistically what that portion is. The following table shows the principal sources of the revenue and expenditure of the State, the figures being those of the estimates for 1894-95:—

*Revenue.*

| | Rx. |
|---|---|
| Land Revenue | 25,703,600 |
| Opium | 6,393,600 |
| Salt | 8,629,200 |
| Stamps | 4,561,800 |
| Excise | 5,317,600 |
| Provincial rates | 3,525,300 |

*Revenue—contd.*

| | Rx. |
|---|---|
| Customs | 2,872,900 |
| Assessed taxes | 1,740,900 |
| Forests | 1,646,000 |
| Registration | 440,000 |
| Tributes from Native States | 775,200 |
| Interest (on loans to local bodies) | 856,800 |
| Post Office | 1,595,000 |
| Telegraphs | 993,800 |
| Railways | 20,408,400 |
| Irrigation (being mainly the portion of land revenue due to irrigation) | 2,463,800 |
| Civil Departments and the Mint | 1,679,400 |
| Military Department | 809,700 |
| Buildings and Roads | 629,200 |
| Miscellaneous | 982,700 |

*Expenditure charged against Revenue.*

| | Rx. |
|---|---|
| Land Revenue | 4,186,800 |
| Opium | 2,255,300 |
| Salt | 518,600 |
| Stamps | 179,000 |
| Excise | 205,200 |
| Provincial rates | 53,000 |

*Expenditure charged against Revenue—contd.*

| | Rx. |
|---|---|
| Customs | 209,500 |
| Assessed taxes | 32,700 |
| Forests | 984,400 |
| Registration | 229,900 |
| Interest | 4,611,400 |
| Post Office | 1,608,100 |
| Telegraphs | 919,600 |
| Railways | 22,562,700 |
| Irrigation | 2,909,400 |
| Civil Departments and Mint | 15,027,300 |
| Army services | 23,912,000 |
| Buildings and Roads | 5,489,100 |
| Miscellaneous (mainly pensions and furlough allowances) | 5,754,000 |
| Assignments and compensations, refunds and drawbacks | 1,808,200 |

## TABLE No. I.

REVENUE AND EXPENDITURE (CHARGED TO REVENUE) OF THE GOVERNMENT OF INDIA FROM 1880-81 TO 1894-95; ALSO CAPITAL EXPENDITURE ON RAILWAYS AND IRRIGATION.

| | Revenue. | Expenditure. | Surplus + or Deficit —. | Capital expenditure on Railways and Irrigation. |
|---|---|---|---|---|
| | Rx. | Rx. | Rx. | Rx. |
| 1880-81 | 74,290,112 | 77,921,506 | — 3,631,394 | 3,670,704 |
| 1881-82 | 75,684,987 | 72,089,536 | + 3,595,451 | 2,715,613 |
| 1882-83 | 70,278,337 | 69,603,500 | + 674,837 | 2,444,410 |
| 1883-84 | 71,842,020 | 69,962,313 | + 1,879,707 | 4,091,469 |
| 1884-85 | 70,690,681 | 71,077,127 | — 386,446 | 4,226,613 |
| 1885-86 | 74,464,197 | 77,265,923 | — 2,801,726 | 5,275,364 |
| 1886-87 | 77,337,134 | 77,158,707 | + 178,427 | 5,670,484 |
| 1887-88 | 78,759,744 | 80,788,576 | — 2,028,832 | 2,784,824 |
| 1888-89 | 81,696,678 | 81,659,660 | + 37,018 | 1,638,001 |
| 1889-90 | 85,085,203 | 82,473,170 | + 2,612,033 | 3,173,390 |
| 1890-91 | 85,741,649 | 82,053,478 | + 3,688,171 | 3,365,632 |
| 1891-92 | 89,143,283 | 88,675,748 | + 467,535 | 3,500,000 |
| 1892-93 | 90,172,438 | 91,005,850 | — 833,412 | 3,985,290 |
| 1893-94 | 90,429,500 | 92,222,300 | — 1,792,800 | 3,643,100 |
| 1894-95 | 92,024,900 | 92,326,800 | — 301,900 | 4,000,000 |

## TABLE No. II.

Registered Debt of the Government of India, showing its growth in India and in England from 1880-81 to 1893-94.

| | In India. | In England. |
|---|---|---|
| | Rx. | £ |
| 1880-81 | 85,959,746 | 71,429,133 |
| 1881-82 | 88,653,162 | 68,141,947 |
| 1882-83 | 90,688,766 | 68,585,694 |
| 1883-84 | 93,191,384 | 68,108,837 |
| 1884-85 | 93,183,660 | 69,271,088 |
| 1885-86 | 92,703,982 | 73,806,621 |
| 1886-87 | 92,653,636 | 84,228,177 |
| 1887-88 | 98,089,862 | 84,140,148 |
| 1888-89 | 100,879,742 | 95,033,610 |
| 1889-90 | 102,761,175 | 98,192,391 |
| 1890-91 | 102,746,555 | 104,408,208 |
| 1891-92 | 102,692,317 | 107,404,143 |
| 1892-93 | 102,937,552 | 106,683,767 |
| 1893-94 | 105,546,078 | 114,113,792 |

## TABLE No. III.

Showing the growth of the principal heads of the Revenue of the Government of India from 1880-81 to 1894-95.

| | Land Revenue. | Opium. | Salt. | Excise. | Stamps. | Customs. | Assessed taxes. | Provincial Rates. |
|---|---|---|---|---|---|---|---|---|
| | Rx. | Rx. | Rx. | Rx. | Rx. | Rx. | Rx. | Rx. |
| 1880-81 | 21,112,995 | 10,480,051 | 7,115,988 | 3,135,226 | 3,250,581 | 2,539,612 | 558,720 | 2,776,370 |
| 1881-82 | 21,948,022 | 9,862,444 | 7,375,620 | 3,427,274 | 3,381,372 | 2,361,388 | 536,829 | 2,895,490 |
| 1882-83 | 21,876,047 | 9,499,594 | 6,177,781 | 3,609,561 | 3,379,681 | 1,296,119 | 517,811 | 2,683,015 |
| 1883-84 | 22,361,899 | 9,556,501 | 6,145,413 | 3,836,961 | 3,513,201 | 1,187,266 | 526,087 | 2,878,731 |
| 1884-85 | 21,832,211 | 8,816,469 | 6,507,236 | 4,011,867 | 3,606,622 | 1,029,943 | 511,828 | 2,791,461 |
| 1885-86 | 22,592,371 | 8,942,515 | 6,345,128 | 4,152,136 | 3,663,174 | 1,199,976 | 503,034 | 2,960,315 |
| 1886-87 | 23,055,724 | 8,942,976 | 6,657,644 | 4,375,174 | 3,751,280 | 1,246,293 | 1,354,735 | 2,999,861 |
| 1887-88 | 23,189,292 | 8,515,462 | 6,670,728 | 4,534,655 | 3,876,298 | 1,348,837 | 1,431,436 | 3,035,323 |
| 1888-89 | 23,016,404 | 8,562,319 | 7,675,634 | 4,705,346 | 3,927,088 | 1,332,784 | 1,520,940 | 3,054,254 |
| 1889-90 | 23,981,399 | 8,583,056 | 8,187,739 | 4,891,894 | 4,087,908 | 1,506,686 | 1,595,274 | 3,410,055 |
| 1890-91 | 24,045,209 | 7,879,182 | 8,523,368 | 4,947,780 | 4,068,969 | 1,743,218 | 1,617,396 | 3,491,240 |
| 1891-92 | 23,965,774 | 8,012,380 | 8,636,182 | 5,117,264 | 4,262,156 | 1,701,288 | 1,652,823 | 3,502,837 |
| 1892-93 | 24,905,328 | 7,993,180 | 8,656,104 | 5,242,443 | 4,448,540 | 1,617,633 | 1,686,141 | 3,705,928 |
| 1893-94 | 25,492,300 | 6,694,400 | 8,346,200 | 5,357,900 | 4,551,000 | 1,658,700 | 1,730,300 | 3,486,300 |
| 1894-95 | 25,703,600 | 6,393,600 | 8,629,200 | 5,317,600 | 4,561,800 | 2,872,900 | 1,740,900 | 3,525,300 |

## TABLE No. IV.

Showing the growth of the Railway Revenue and of the Railway Expenditure (charged against Revenue) from 1880-81 to 1894-95.

| | Revenue. | Expenditure. |
|---|---|---|
| | Rx. | Rx. |
| 1880-81 | 9,435,336 | 10,479,386 |
| 1881-82 | 10,885,483 | 11,171,067 |
| 1882-83 | 10,973,030 | 12,278,890 |
| 1883-84 | 11,960,157 | 12,265,069 |
| 1884-85 | 11,898,131 | 12,949,306 |
| 1885-86 | 13,684,084 | 14,415,797 |
| 1886-87 | 14,477,759 | 15,666,427 |
| 1887-88 | 14,533,360 | 16,655,746 |
| 1888-89 | 15,520,696 | 17,754,088 |
| 1889-90 | 16,605,601 | 18,458,202 |
| 1890-91 | 17,235,978 | 17,923,269 |
| 1891-92 | 19,938,046 | 20,253,910 |
| 1892-93 | 19,077,103 | 20,924,155 |
| 1893-94 | 20,206,500 | 21,803,500 |
| 1894-95 | 20,408,400 | 22,538,300 |

## TABLE No. V.

Showing the growth of Military Expenditure since 1877-78 (including Special Defence Works since 1886-87).

| | Army Services. | Special Defence Works. | Total. |
|---|---|---|---|
| | Rx. | Rx. | Rx. |
| 1877-78 | | | 17,300,484 |
| 1878-79 | | | 17,938,784 |
| 1879-80* | | | 22,580,715 |
| 1880-81* | | | 28,932,497 |
| 1881-82 | | | 19,688,510 |
| 1882-83 | | | 18,359,433 |
| 1883-84 | | | 18,123,629 |
| 1884-85 | | | 16,963,803 |
| 1885-86† | | | 20,097,779 |
| 1886-87 | 19,525,042 | 325,626 | 19,850,668 |
| 1887-88 | 20,417,934 | 456,017 | 20,873,951 |
| 1888-89 | 20,301,841 | 789,595 | 21,091,436 |
| 1889-90 | 20,677,814 | 689,481 | 21,367,295 |
| 1890-91 | 20,690,068 | 491,837 | 21,181,905 |
| 1891-92 | 22,280,601 | 604,848 | 22,885,449 |
| 1892-93 | 23,419,111 | 458,060 | 23,877,171 |
| 1893-94 | 23,413,800 | 342,000 | 23,755,800 |
| 1894-95 | 23,759,700 | 152,300 | 23,912,000 |

* Campaigns in Afghanistan.

† Apprehension of war with Russia following on the collision between the Russians and Afghans at Panjdeh, and consequent preparations for mobilisation, permanent increase of the army strength, and construction of Special Defence Works.

# FINANCE AND TAXATION

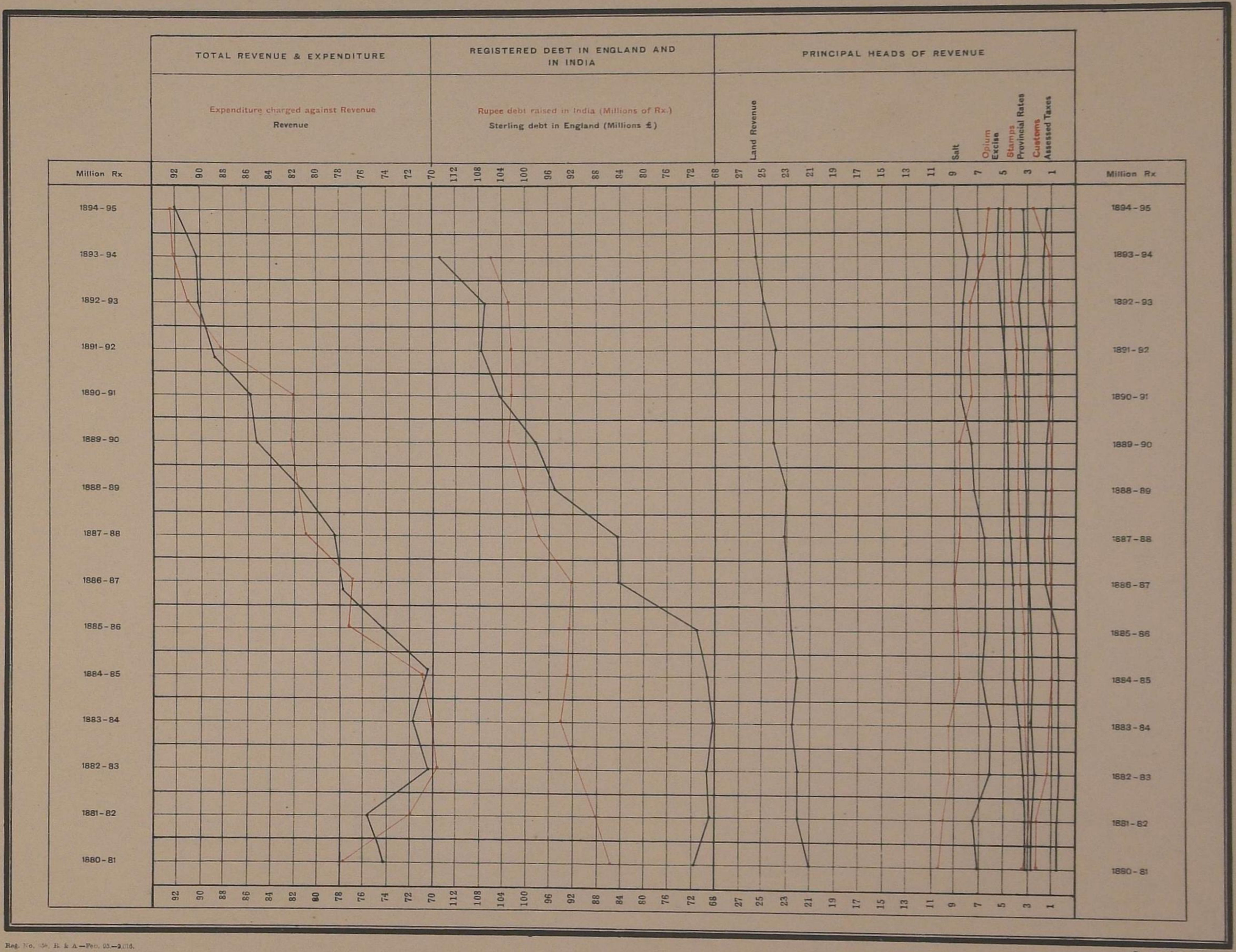


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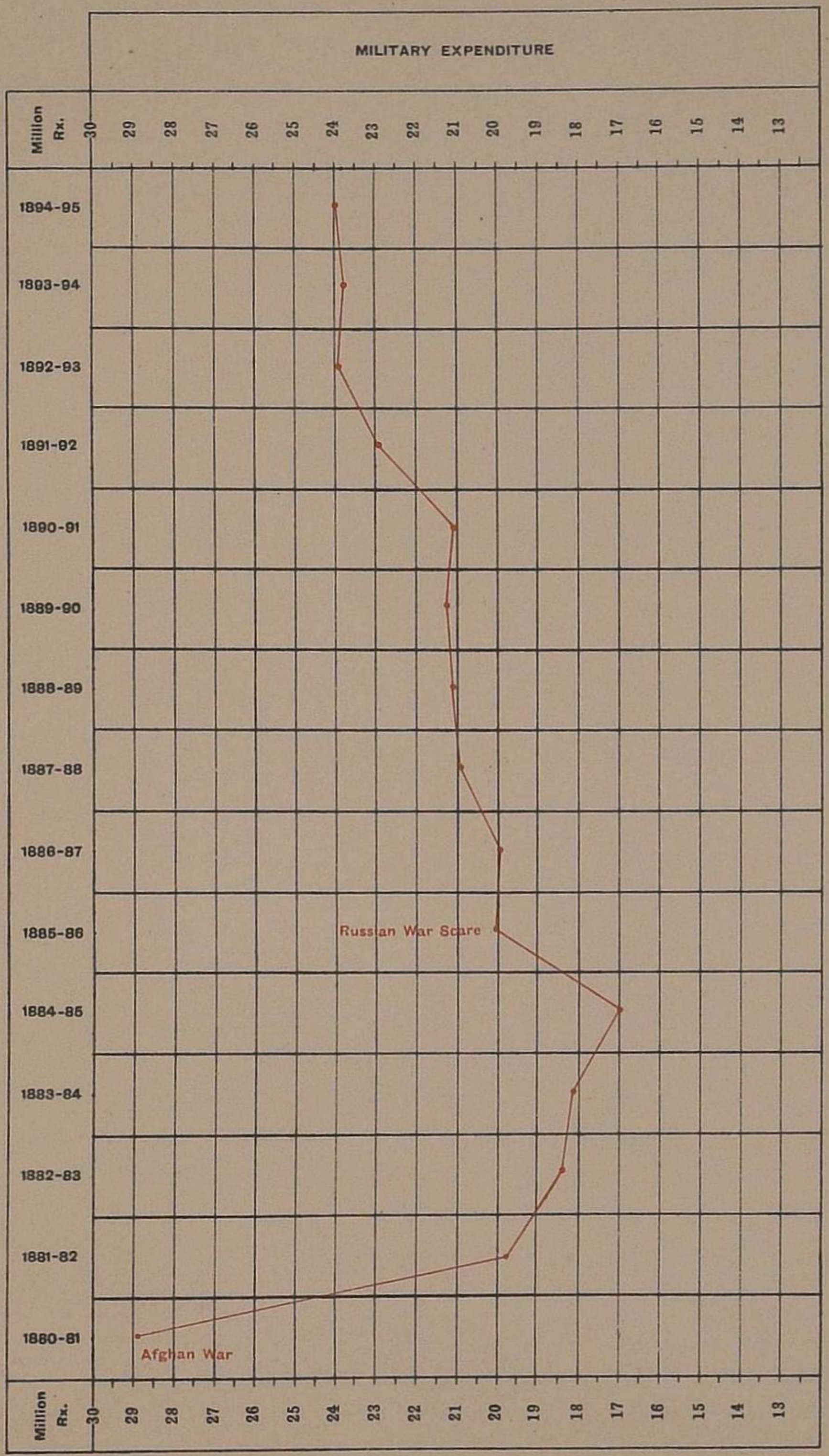
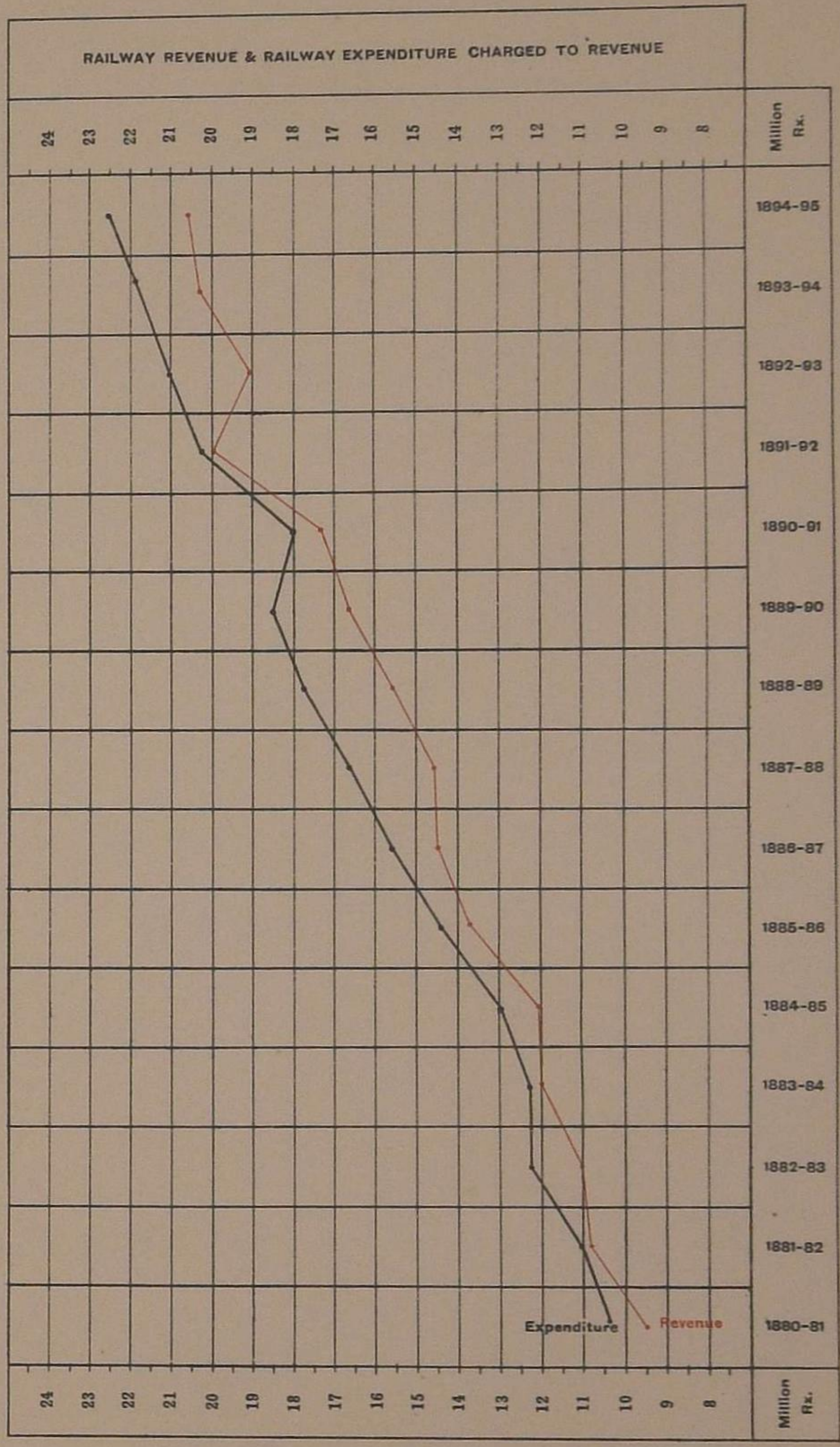
Photo. S. I. O., Calcutta.

## FINANCE AND TAXATION

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# CHAPTER XIV.

# LAND TENURES AND REVENUE SYSTEMS.

IN approaching an examination of the Land System of India as it existed before the occupation of the country by the British, the student must divest himself of preconceived notions derived from western sources, of proprietorship in land, or of relations between landlords and tenants. The fundamental idea to be grasped is that in most parts of India as in other oriental countries the primary proprietor of the land and its produce was the ruler of the territory in which it lay: in other words the State itself: while in all, the State exacted a share of the produce which usually left little more than subsistence to the cultivators. This idea found curt expression in the following maxim quoted by a writer in the reign of the Emperor Akbar, under whose directions the administration of land revenue was, for the first time, systematically organized: "There shall be left for every man who cultivates his land as much as he requires "for his own support till the next crop be reaped and that of his family and for "seed. This much shall be left to him; what remains is land tax and shall go to the "public treasury."

In examining the application, under native rule, of the principle thus enunciated, the following considerations must be borne in mind.

In the first place, it was obviously impossible to carry it out in exact and close detail. No precise measure could be taken of the varying requirements of each cultivator or of the amount of produce in each field. As a fact, a rough appraisement was usually made of the amount of produce either raised, or capable of being raised, on each class of land and a share of it, such as would approximately leave to the cultivator enough for his maintenance, determined as the due of the State. The various methods of appraisement will be found, by the student who desires more detailed information on the subject, in Thomason's Directions to Settlement Officers (North-Western Provinces), a most instructive work.

In the second place, the State's share, however it might have been appraised, was collected in produce or "kind" and not in "cash." It was in Akbar's celebrated settlement that the first general attempt was made to convert payments in kind into payments in cash, subject to a decennial revision much like that which in England governs the periodical assessment of tithes. The attempt only succeeded partially and, at the beginning of this century, payments in kind were, in many parts of India, found to be as prevalent as payments in cash. The British Government has gradually extended the latter system until payments in kind have become a rare exception, though in many Native States they still largely prevail.

In the third place, it was naturally inconvenient for the State itself, especially in troublous times, to undertake the collections of revenue from each cultivating occupier of land. Various intermediaries came therefore into existence. In some cases contracts were made with influential or wealthy persons for the collection of revenue from a given territory; in others the responsibility was placed on the headman of a cultivating community, whose position was no more than that of *primus inter pares*. Then again the absorption of smaller States into larger ones led to the partial maintenance of the ancient rights of the minor rulers or chiefs to collect the revenue from their States, and they were often only subject to a tributary payment to the Sovereign power. They were thus not altogether shorn of their hereditary royal claim to State revenue, and were placed somewhat in the position of the feudal landlords of Europe. Their title, however, to collect land revenue in their own behalf was derived from their initial position as more or less independent rulers.

In the fourth place, under Native rule, neither cultivators of land nor intermediaries between them and the ruling power had the power of transferring by sale, gift, or mortgage the interests they possessed in the land. Exceptions to this rule were so rare that they need not be taken into account. The only right or prescriptive claim respected by the State was that allowed to those who had first settled on the land of remaining on it so long as the assessment levied by the State was paid. Even in the case of failure they were seldom ejected.

The natural effect of the conferment of new rights and powers on those whose status had been merely collectors of, or contractors for, the payment of land revenue into the State coffers was that the position of some few of the agricultural community was unduly raised, while that of a large majority was unduly lowered.

Thus, in 1848, we find a well known authority* writing of the position of those who paid the land revenue into the Government Treasury in the following words:—

> "The only person recorded in the district office as 'proprietor' was the person who contracted to pay the Government revenue. In some cases he was the representative of the village community, many of whom had equal and, perhaps, larger interests, and in others the purchaser of a share in an estate who had, by purchasing the interests of some and paying up arrears due on other shares, gradually become sole 'proprietor.'"

These few words illustrate sufficiently the confusion which had arisen on the one hand from the endowment of the contractor or payer of land revenue with the status of an European 'proprietor,' and on the other from the conferment of a power to transfer interests in land by sale or mortgage.

Finally, and this is an important consideration—there was, under native rule, and, even until recent years, in British Provinces, much competition for cultivators and little or no competition for land. The ruler of a State, therefore, and those to whom he had delegated his authority to collect the land revenue, were only too glad to allow the occupiers of land to remain on it. They had no inducement to drive them off by forcible measures or impossible exactions. They had recourse to expulsion only in the rare event of contumacious refusal to surrender the amount of revenue properly claimable by the State and they took care, when any failure of crop occurred

* NOTE.—Mr. Montgomery, Collector and Settlement Officer of Cawnpore.

through accident of season, to lower the demand in proportion to the power of the occupant to pay. After British occupation, the collectors of land revenue, invested with the status of 'proprietor' or 'landlord,' were, in many Provinces, permitted to claim, as if it were 'rent,' the payment of 'land revenue' contributed by the occupiers of land and to retain a large share for themselves; to enhance, often without restriction, the amounts payable; to eject cultivators; to distrain their crops; and generally to exercise absolute control over them. In view of the fact that the new status was conferred at a time not very long antecedent to the period when competition for tenants was succeeded by competition for land, a critical change, which in all countries has a serious effect on the relations between landlords and tenants, the position of the cultivator (reduced from that of the land revenue payer to that of the rent payer) became, in many Provinces, so uncomfortable and insecure as to lead to various restrictions of the wide powers at first conferred on the intermediary collectors of land revenue.

It will be gathered from the above considerations, briefly as they have been put forward, that western notions of property in land and western nomenclature involving such terms as 'proprietor,' 'landlord,' 'tenant' and 'rent' were inapplicable to the system of land revenue formerly existent in India. It will be also understood that the transfusion into the system of European ideas and practices in accordance with the varying idiosyncracies of individual authorities in different parts of India was the cause, not only of no little confusion, but also of varying types of land administration.

The limits within which this chapter must be kept prohibit anything like a detailed history of the growth of the separate land system as now existing in each Province, and the brief exposition given above merely aims at calling the attention of the reader to the original uniformity of the land system throughout India; to the wide difference between that system and the systems now prevailing in Europe; to the main points of divergence; to the transfusion of western ideas, in varying degrees, into the systems of different Provinces; as, for example, the conferment of a right to transfer interests in land, the conversion of a land revenue collector into a proprietor or landlord, the creation of 'tenants' and with them of 'rent', and so on. Without some conception of the changes thus effected, the present position of land revenue administration in India could not have been comprehended. The extent of these changes is forcibly represented in a note written by an eminent official* in 1876 on the revenue system existing in the Central Provinces before British rule :—

"'I am convinced,' he wrote, 'that in order to a right understanding of the different parts of the Province, we must begin rather by recognizing their original similarity. Diversity, at the present day, there no doubt is, but it is a diversity which has arisen, not from original and inherent difference, but from the fact that, in quite recent times, diverse influences have impressed themselves upon systems which were in all essential respects the same. The position which I would lay down is this that, speaking broadly, identical revenue systems prevailed in all districts at the time when they severally came under our rule and influence, and that all the differences which they now present are due, first, to the diverse training and prepossessions of the officers through whom we administer them; secondly, to differences in the revenue systems which such officers looked to as models; and thirdly, to the length of time during which the two preceding conditions have been operating. In short I would affirm that such differences as exist are of our own creation.'"

A very brief examination of the systems at the present time existing in different parts of British India may now be approached. The following conspectus of the land systems of the various provinces will be best understood by the reader if he bears in mind the general proposition already indicated that the key to the position is the fact that the person who was first under British rule recognized as responsible for the payment of land revenue into the State treasure chest was often accepted as proprietor of the land in respect of which the payment was made.

In *Madras, Bombay and Berar* the payers of land revenue were, as a rule, the small cultivating occupiers—or 'ryots.' Hence the settlement of land revenue made with them was termed a "ryotwari" settlement. There were in the ryotwari areas no intermediaries, at any rate none were recognized, and the ryots have practically drifted into the position of tenants of the State which now exercises over them many of the functions usually ascribed in Europe to a landlord. But in Madras extensive territories, mainly adjacent to the Central Provinces and Bengal, were found to be in the possession of quasi-independent chiefs who were accorded the position of absolute proprietors on the payment of a quit revenue to the paramount State, and these have hitherto been allowed unrestricted authority over the ryots. The settlement made with them is termed 'Zamindari' because, in Lower India, the term 'Zamindar' (*zamin*—land and *dar*—holder) was usually applied to the chiefs of large territories although, in the north, the term designates the holder of any land, however small.

In *Bengal* the collectors of land revenue from the ryots were found to be either large zamindars (as in the zamindari areas of Madras) or contractors of land revenue, or other influential persons. All were granted the position of absolute proprietors, and Lord Cornwallis granted them, as he did to the Madras zamindars, a permanent settlement. The few instances of exclusion from the permanent settlement are due to historical causes which cannot be examined in this brief synopsis. An important fact, however, must be borne in mind that whereas in the ryotwari areas of Madras and Bombay as well as in the zemindari areas of Bengal the ryots were granted the power of transferring their interests by mortgage and sale such was not the case in the *Madras* zamindaris.

In the *North-Western Provinces*, the persons responsible for collecting and paying into the treasury the land revenue were indiscriminately accepted as proprietors. Territorial chiefs were, however, few, but on the other hand much of the land was held by tribal communities, the descendants of original settlers. In some cases, when these communities were found to be paying their land revenue through their own representatives, they were recognized as proprietors; in others they sank to the level of tenants, their rights being, as already indicated in the quotation from Mr. Montgomery's note, absorbed by powerful members of the community itself or by influential outsiders. The right of transfer was, in this Province, only conferred on persons recognized as proprietors, not on those reduced to the position of tenants, and it is worthy of observation that those communities who were endowed with the higher status have, to a large extent, been rapidly broken up in consequence of the new facility given to them of parting with their rights and interests, whereas those whose position was lowered have, in the absence of any such facility, retained, as tenants, their occupation of the land originally held by them.

In *Oudh*, a province acquired in comparatively recent years, a system had, in consequence probably of the weakness of the ruling power, come into force of granting contracts for the collection of revenue over extensive areas by agents nominated by the State. Sometimes these were foreigners to the country, some-

* Mr. W. B. Jones, afterwards Chief Commissioner of the Central Provinces.

times powerful members of the local community, and in some cases hereditary chiefs. These were accepted by the British Government as superior landlords, the members of tribal communities subservient to them being accorded the status of inferior landlords. During the mutiny, which occurred 3 years after the occupation, many of the superior proprietors who opposed the British lost their new rights which were transferred to influential persons who had supported the paramount power. The primary payers of land revenue or the cultivating occupants were until recently granted no status at all.

In the *Punjab* the cultivating occupants were for the main part found to be cultivating communities on whom proprietary rights were conferred without reserve. Intermediary collectors of land revenue did not, as a rule, exist and every member of the community was accepted as a proprietor. So far, therefore, the former conditions were less disturbed than in any other of the Northern Provinces; but as the new right of transfer was, as elsewhere, granted to the cultivators now created 'proprietors', the communities have been largely broken up and their rights and interests absorbed by outsiders. Another point may be noticed. The term *zamindari* was carried through Bengal and the North-Western Provinces to the settlement of the Punjab notwithstanding that the position of the payers of land revenue in the latter Provinces assimilated, in some respects, more to that of the ryot of Madras and Bombay than to that of the zamindars of Bengal.

In the *Central Provinces* the actual payers of land revenue into the treasury were usually head men, *primi inter pares*, of the village communities, with the exception of the chiefs of some large zamindaris of the Madras class who were placed on the same footing as the Madras zamindars. The collectors of land revenue were, however, as in Bengal, accorded proprietary rights and those who really contributed the revenue were reduced to the position of tenants. Here again in consequence of the creation of intermediaries the settlement has been called 'zamindari.'

The next subject to which attention must be called is the system of settlement or assessment of the land revenue. On no branch of Indian administration could so much be written. The official records which deal with it would alone fill a large library. In the space of this chapter only a brief exposition is possible, and for more detailed information the reader is referred to Strachey's 'India' and to Thomason's 'Directions to Settlement Officers' (North-Western Provinces).

The fundamental idea underlying the land settlement has already been indicated in the 'maxim' of Akbar's reign quoted at the beginning of the chapter. It found new expression in the following words recently used in an important State document:—

"In India the right of the State to a specified share of the produce of the land is established by long-continued custom and by the historical precedents of many centuries. In asserting this right the State acts as the representative of the whole tax-paying community of the Empire whose interests it is its bounden duty to guard and protect from encroachment."

The attempts made in the earlier years of British occupation to assess the amount to be taken from each person made responsible for the payment of land revenue into the Treasury—in other words from each newly-created proprietor—were naturally crude and imperfect. Much confusion was, in the so-called 'zamindari' Provinces, caused by the new relations established between the primary payers of the revenue or the cultivating occupants transformed into tenants and the collectors of the revenue—now constituted proprietors or landlords. The pre-existing system of very short settlements, readjusted after 1, 2 or 3 years, was at first followed; and, as under native rule, a very small margin of the produce or of its value was surrendered by the State. These conditions often led to the failure of the persons responsible whose interests were for the first time made saleable and who received no sufficient consideration for failure of crops in bad seasons. In Bengal a grand attempt was made to ascertain by local enquiry the average value of the produce in each field, but it broke down owing to the inherent difficulties of the task. The claim of the State was therefore gradually lowered and the term of settlement lengthened. In Bengal the assessment was, in 1793, made permanent, while in the North-Western Provinces, the Province next occupied, the attempt to assess the value of land was followed up and partly for the above reason, partly for political considerations, the term of settlement gradually increased to 30 years. From 1840 to 1880 revisions of assessment in the North-Western Provinces, the Punjab, Oudh and the Central Provinces were continuously carried on. The first step was to make a field survey and map of each village; the next to ascertain, as far as this could be done, the various classes of soil and their productive capabilities; then to find out, by enquiry, the rates hitherto paid by the cultivating occupants on each class; thus to frame an estimate of the aggregate amount received by each of the persons responsible for the State revenue, and lastly to estimate the share of that amount payable by the latter to Government. In each district these operations usually occupied from 7 to 10 years, and often cost the State half as much income as they brought in.

The following table shows the gradual increase in the share of the assets (*i.e.*, of the amount collected from the cultivating occupants) which the collecting agents or newly-constituted proprietors have been allowed to retain in the North-Western Provinces. The State share has declined in proportion. The Province named has been selected for the purpose of illustration because, when once Bengal had been permanently assessed, it became the principal field of assessment, and because the practices adopted in the North-Western Provinces were followed in all other zamindari provinces not permanently assessed:—

| Year. | Share of assets surrendered to the collecting agents or proprietors. |
|---|---|
| 1812 . . . . . . | 10 per cent. of prospective assets. |
| 1822 . . . . . . | 20 „ „ |
| 1832 . . . . . . | 27½ „ „ |
| 1849 . . . . . | 33⅓ „ „ |
| 1855 . . . . . . | 50 „ „ |
| 1885 . . . . . . | 50 per cent. of actual assets. |

The term 'prospective assets' means an estimate of the annual assets which the proprietors were likely to obtain during the coming term of settlement, whereas the term 'actual assets' means the annual assets actually obtained at the time of settlement. The actual assets are often much less than the prospective assets. A further surrender to the proprietors of the State's share, beyond the reduction to 50 per cent. of the actual assets, has been frequently made in cases where it is believed that the proprietor will for any reason find difficulty in making a punctual payment of the 50 per cent.

Within the last 20 years many important reforms have been effected in the land revenue administration. In the first place, the laws governing the relations between landlords and tenants and the assessment of rent and of revenue have been over-

hauled with the view mainly of placing the cultivating occupiers of land in a better position, one, in fact, more in accordance with that which they originally held before being constituted mere tenants of the intermediary collectors of land revenue. Again, the system of settlement has been improved and simplified in order to avoid both expense and the harassment of the agricultural population caused by the continual invasion of armies of surveyors and land appraisers. The key of reforms in this direction has been the maintenance of an accurate land record in each village showing year by year the fields cultivated, the crops raised, the area irrigated, the rent payable and paid, and names of tenants and landlord, and so on. On the basis of this record kept up to date by local agency an estimate of the actual assets can be arrived at much more easily and rapidly than was possible in the case of an estimate of prospective assets made on an entirely new record drawn up once every 20 or 30 years by persons unacquainted with the villages. The cost of new settlements is now one-fifth of what it used to be. A further reform of importance has recently been brought under consideration. The question has been asked whether the right to transfer of rights and interest in land, the conferment of which has led to the alienation of much land from the hereditary occupants, can in any way be curtailed.

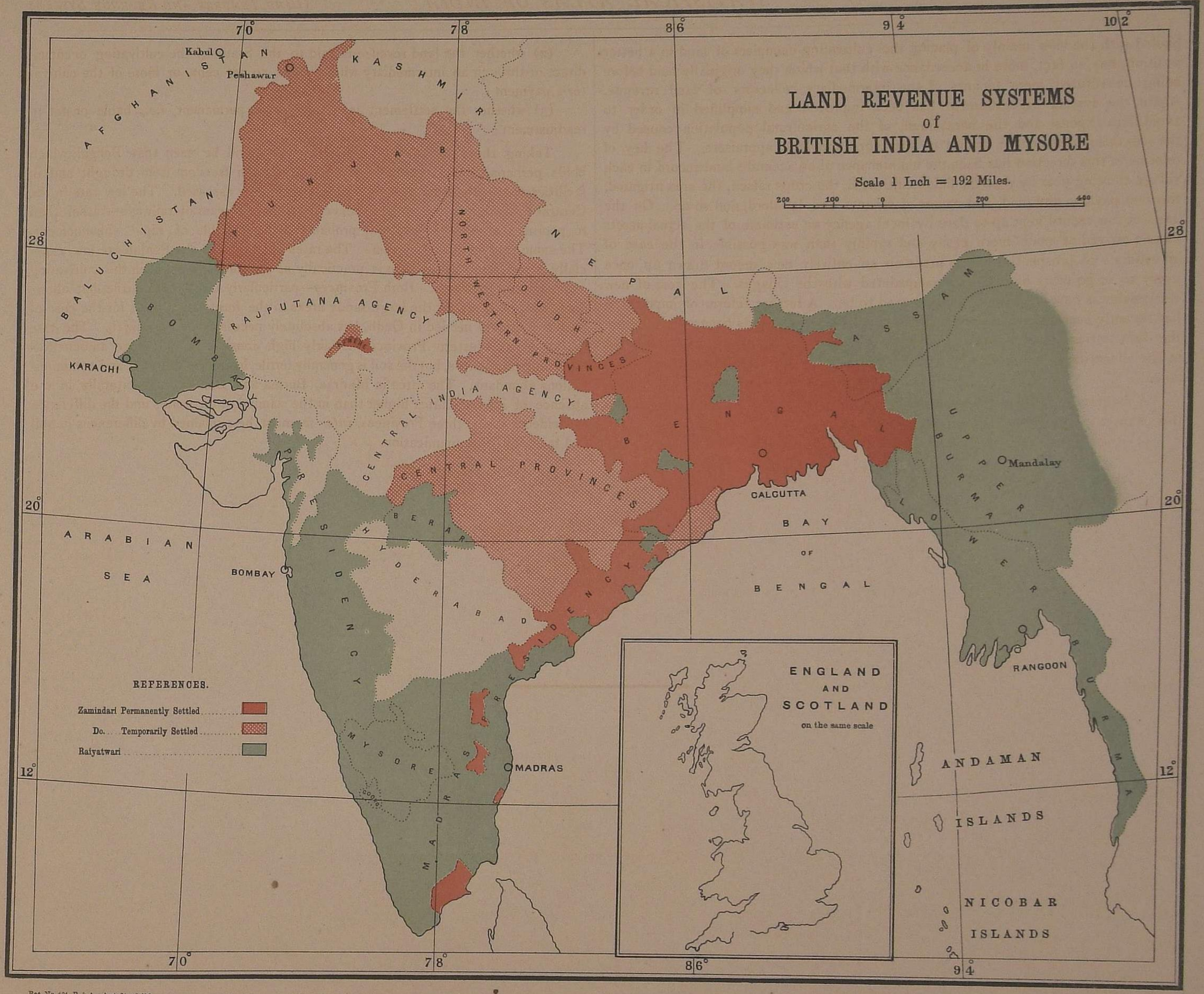
A diagram showing the incidence of land revenue in each Province is appended to this chapter. The three main factors or questions which affect the incidence are—

(1) the relative productiveness of the soil and value of its produce;

(2) whether the land revenue is paid to the State by the cultivating occupant direct or through an intermediary who absorbs 50 per cent. or more of the cultivator's payment;

(3) whether the settlement is temporary or permanent, *i.e.*, liable or not to readjustment;

Taking these factors into consideration, it will be seen that Bengal, which holds perhaps the first place in fertility of soil, in freedom from drought and in facilities of communication, is by far the most lightly assessed. The low rate in the Central Provinces is due to the absence until recent years of railways—rather than to poorness of soil, and it will probably be susceptible of rapid enhancement. The same may be said of Assam. The rates in Oudh and the Punjab are low, especially in the latter where there is practically no intermediary between the cultivating occupant and the State. Both Provinces—particularly Oudh—are fertile, but allowance must be made for the large sandy areas in the former as well as for the cost of irrigation, hardly needed in Oudh, but absolutely necessary in the Punjab. The rate in the North-Western Provinces is fairly high considering the large amount absorbed by proprietors, but the soil is generally fertile, irrigation plentiful, and communications abundant. The rates in Madras, Burma and Bombay are naturally in the absence of intermediaries higher than in the zamindari territories and the difference in incidence in the three Provinces, *inter se*, must be explained by differences in soil and facilities in communication.

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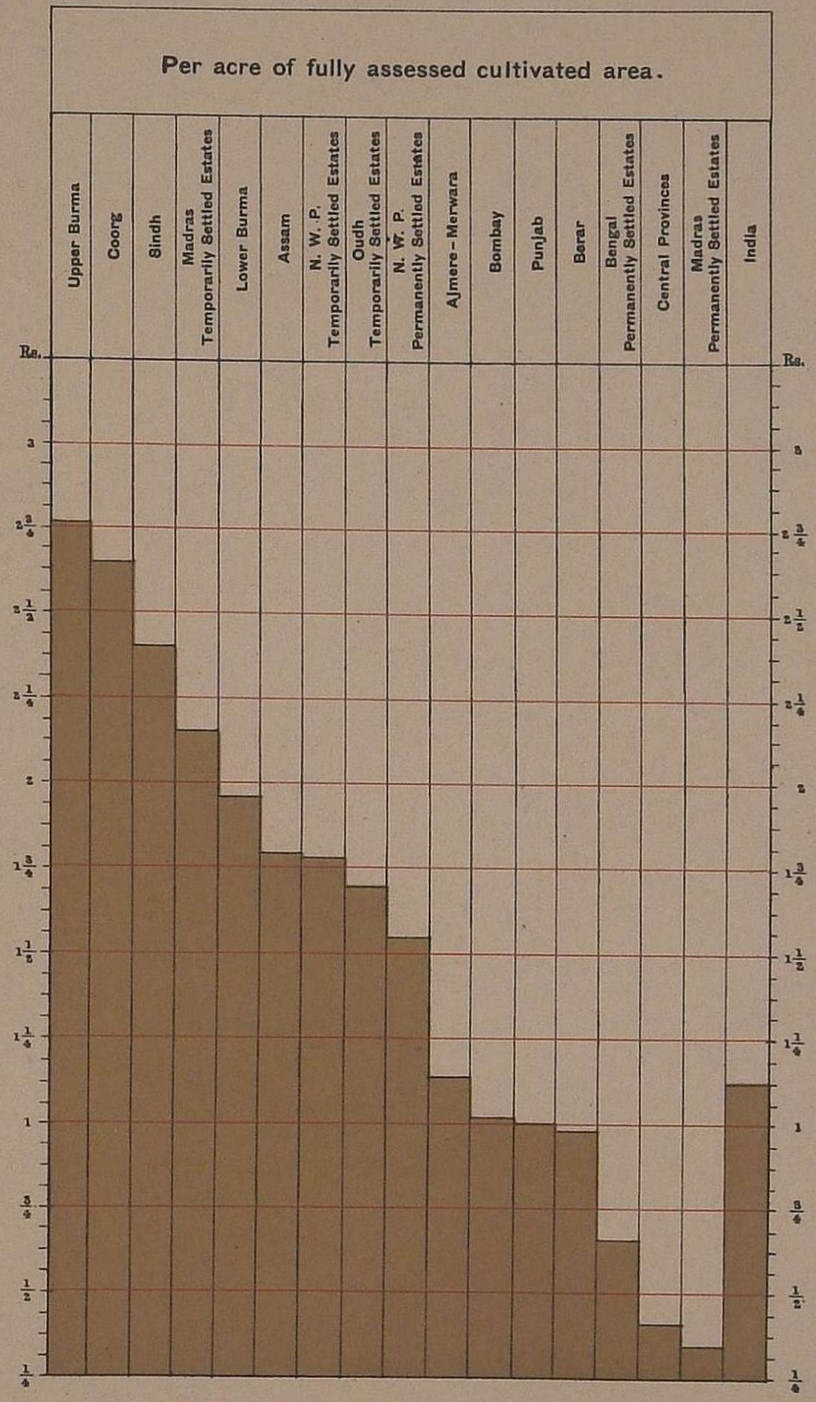
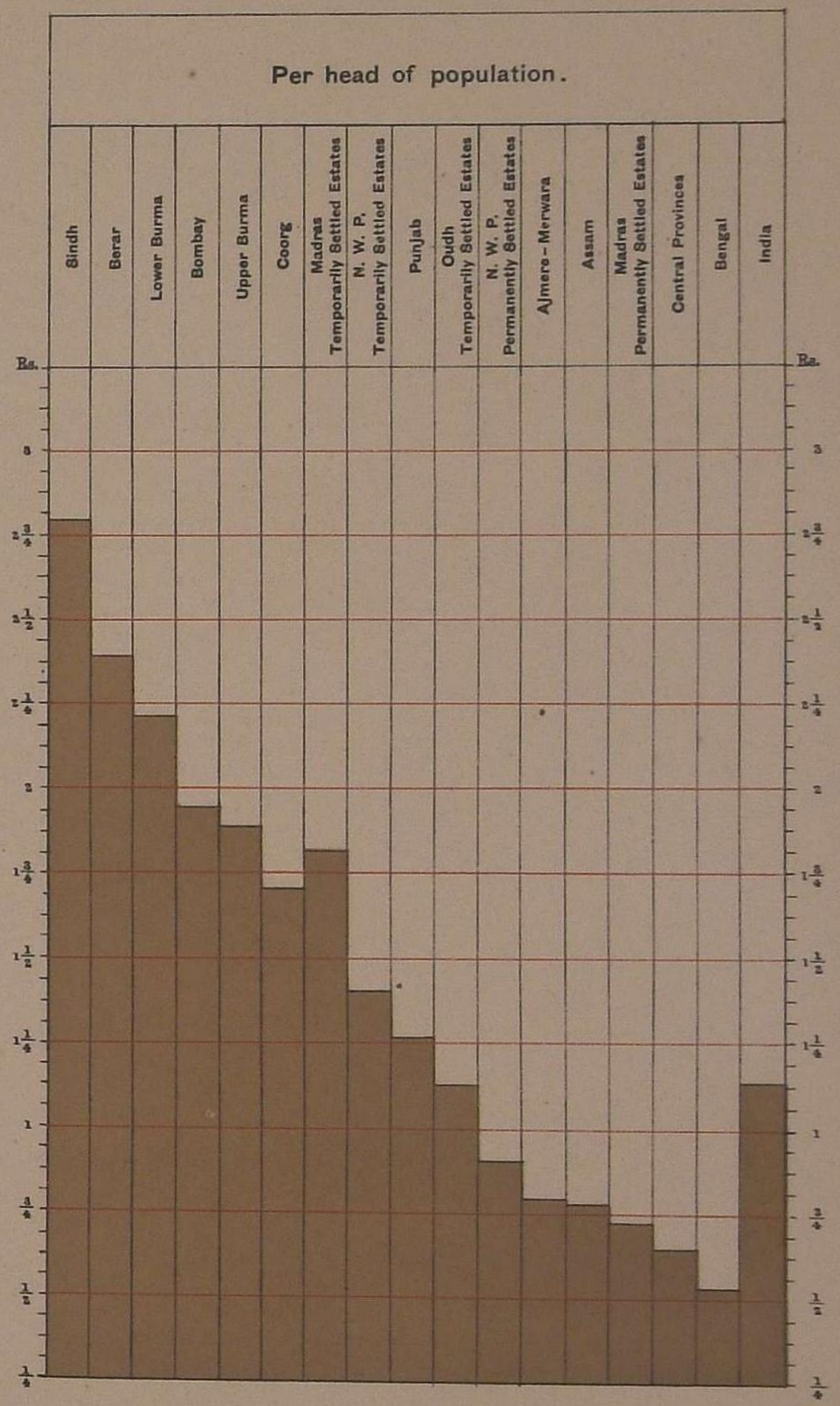
NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

Litho., S. I. O., Calcutta.

# INCIDENCE OF LAND REVENUE 1892—3.

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# CHAPTER XV.

# THE PEOPLE.

THE population of India as enumerated at the Census of 1891 is 287,223,431; but if we include the French and Portuguese Settlements and the wilder tracts, where no correct enumeration has yet been made, we may estimate the total population at something over 289,000,000. This represents a number of human beings more than seven times as large as that residing in the British Isles, and more than four times as large as that found in the United States of America. A quarter of this population lives under Native rulers, protected by the British power (see Chapter XIX below), and the remaining three quarters are directly under British Government.

The people are for the most part agricultural and are not crowded into towns as they are in England. It has been estimated that in England 53 per cent. of the whole population is found in towns of 20,000 inhabitants and upwards, whereas in India not 5 per cent. of the people live in such towns. The only really large towns in India are those which, like Calcutta (population with suburbs 961,670) or Bombay (population 821,764), have been raised from the position of petty hamlets by the influence of foreign trade and capital. The people as a rule live in villages, and these villages do not all present the same sort of appearance. Amid the rice fields of Bengal, for instance, we find the people living in small and scattered groups of cottages, built of mats and thatch and embowered in a jungle of bamboos and fruit trees; in the sandy wastes along the Lower Indus each family lives in its mud huts around its own well or upon its own fields; while in North-Western India the whole population of the village crowds at evening with its cattle and all its belongings into a central group of thickly-congregated houses for the most part mud-built. The people who live in these villages are not, like the villagers of England, almost entirely dependent on the towns for their necessaries: each village has its hereditary artizans who, to a very large extent, spin the clothes of the inhabitants, make their shoes, repair their implements, build their houses, fashion their eating and cooking vessels, and so forth. Throughout the greater part of India, too, there is in each village a higher class of inhabitants who own or rent the land, and a lower landless class who help them in their harvesting or weeding, run their messages, guard their houses, or in other ways do menial service for them. The great point to observe, however, is that though there are artizans and menials in these villages as well as men who gain their living directly from the land, the larger number even of the former class is to a great extent dependent on the soil, and indeed upon the harvest, for many of them are remunerated, not by payment for piece-work, but by a customary share of the produce. Thus it may be said that of the whole population of India, some three quarters look to the produce of the land for their living.

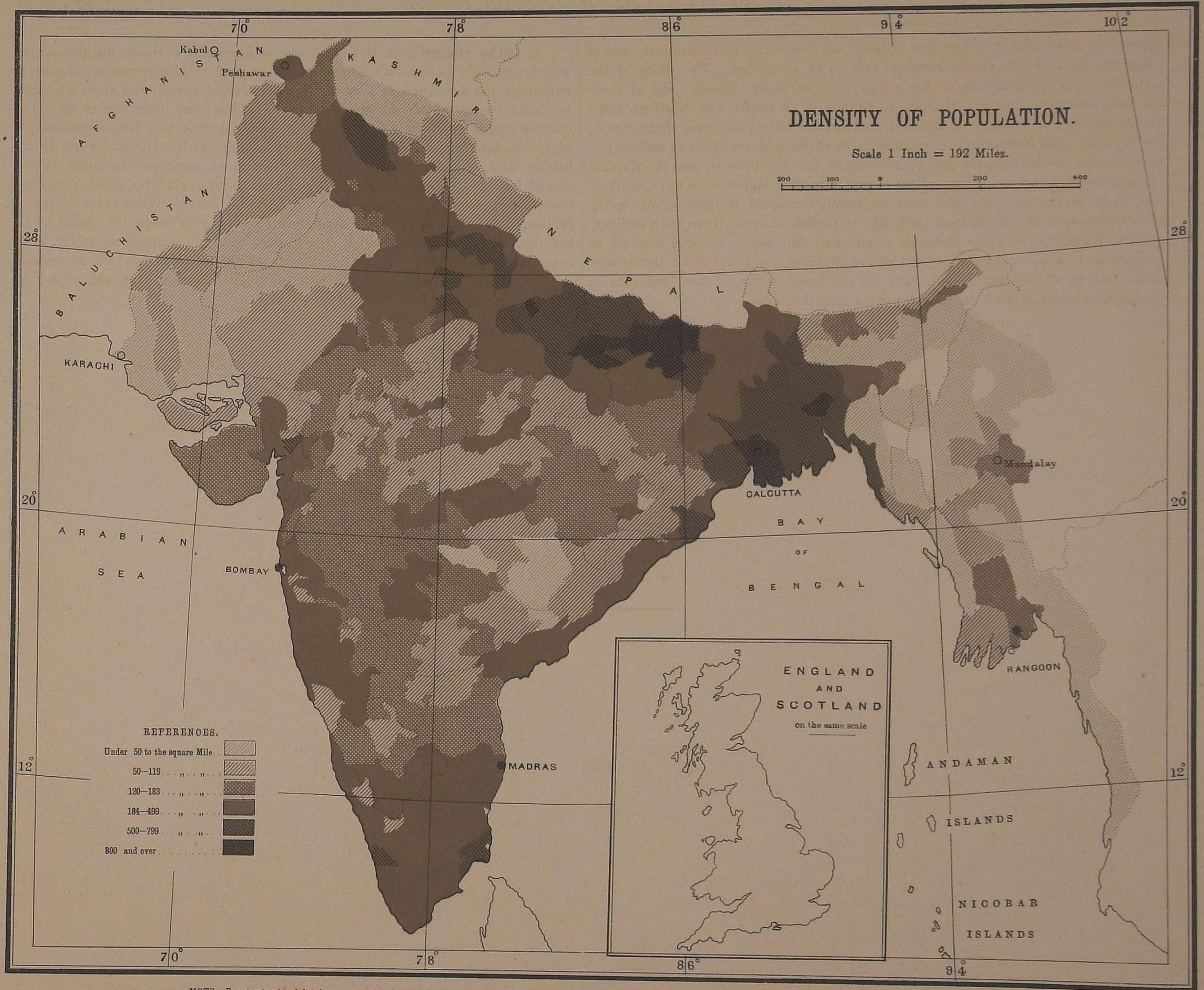
It is this which renders the question of the pressure of population on the soil so important in India. This question is alluded to in the chapters on Famines and Emigration, but it may be mentioned here that although the average density of the people in India is 184 to the square mile, which is very much the same as the average density in France, yet, as a glance at the map below will show, the people are by no means evenly distributed over the country. While the hills of the Central Provinces and the sands of Western Rajputana are scarcely occupied at all, great masses of people are huddled together in the Lower Ganges Valley or in the deltas of Southern Madras, and the extent of this so-called "congestion" exceeds anything with which we are acquainted in Europe. Mr. Baines in reporting on the Census of 1891 writes: "In Europe we find three countries with a density of 500 per mile and over, England and Wales with 500, Belgium with 540, and Saxony with nearly 600. The aggregate population of these is 38½ millions. In British India there are 37½ millions of the inhabitants living in the ratio of more than one per acre, or 784, on the average, to the mile. No less than 21½ millions are packed to the extent of 877. The whole of the 37½ millions in question are to be found in the Ganges Valley and Delta and, with the exception of 2½ millions, which may be called suburban, live in the main by cultivation of the soil."

Another feature to be noticed in regard to the 287 millions of people who inhabit India is that they are not one nation. They are not even a collection of different nations such as we have in Europe; nor would it be sufficient to say that they are a collection of different races such as we find in the Turkish Empire and in Austria-Hungary. A considerable part of the population is no doubt divided into races of this type, such as, for instance, the Pathans and Biluchis of the North-Western Frontier, the Bhils, Gonds, and other hill tribes of Central India, the Burmese and the numerous semi-savage people who inhabit the hills on the outskirts of Burma and Assam. It is possible, too, though in some cases not easy, to trace the descent of the different items of the population from several distinct racial sources, such as the Aryan, Scythian, Dravidian, and so forth. But as a general rule the people of India have divided themselves off, on the basis partly of race, partly of occupation, and partly of mere tradition, into a large number of what we may term water-tight compartments, known as castes. Some of these are more distinctly racial in origin, such as the Jats of North-Western India. Others are almost exclusively occupational, such as the 4 millions of Telis or oilmen, the 3 millions of Julahas or weavers, the 11 millions of Chamars or leather workers, the 3 millions of Mahars or village menials, and many others, though even in these cases, the occupation is for the most part hereditary and its followers confined to it by the accident of their birth. There is a large residuum of castes, however, of which the origin

has not yet been shown to be either entirely racial or entirely occupational, and of these the bulk of the people may be said to be composed. The tillers of the soil, who form the backbone of the country, are of many castes, and of these the most numerous are the Kunbis or Kurmis of Western and Northern India (10 millions), the Vellalas (2 millions), and the Reddis (3 millions) of the South, the Kaibartas and Namasudras (2 millions each) of Bengal, the Kolis (3 millions) of Bombay and the Deccan, the Jats (7 millions) of the North-West, and the Rajputs (10 millions) who are found throughout the north, centre, and west of the country.

There are many castes also who are mainly occupied in trade or in clerkly professions, such as, for instance, the Vanias or Banias, of whom there are 3 millions, and the Kayasths, of whom there are 2 millions. And supreme above them all in sanctity and exclusiveness are 15 millions of Brahmans, who, scattered throughout India, mix in all the higher and many of the lower walks of life, and receive from their co-religionists a vast amount of traditional respect.

It will be inferred from this that caste is essentially a Hindu institution, and so it is in origin as there is nothing in the aboriginal or Muhammadan religions to encourage the formation of a system such as that of caste. But there are many so called castes among the Muhammadans of India and there are many of the country castes in which a large proportion of the people are Muhammadans. A Muhammadan Rajput, for instance, is every whit as much a Rajput as his Hindu brother, and is acknowledged as such. A Hindu on conversion to Islam will be ousted from his Hindu brotherhood, and such converts will form either a separate branch of their original caste or an entirely new caste. When there is not a Muhammadan branch of the caste already existing or when the caste is so low that they are ready to forget it, the most common arrangement is for such converts to give themselves the Arabic tittle of Shaikh, and there are 28 million persons, mostly in Eastern Bengal, who so style themselves, and who as a rule are in no way bound by caste restrictions.




NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

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Litho. S. I. O., Calcutta.

# CHAPTER XVI.

# LANGUAGES AND RELIGIONS.

## LANGUAGES.*

ACCORDING to a native saying, the language in India changes every ten miles, and when it is remembered that only six per cent. of the population is not wholly illiterate, it will be understood how difficult it is to define and mark off from each other distinct types of language such as we are accustomed to in European countries. Attempts have, however, been made in this direction, and at the recent census more than 80 distinct languages were found to be in use among the native inhabitants of the Indian Empire.

These languages can, however, be grouped according to their philological relations, and the area covered by the various groups, which are indicated by the colours in the map below, corresponds fairly closely with the area of the predominance of the main race-families. Thus we find in the east and north-east a group of languages which has for convenience been classed as Tibeto-Burman: in the south and south-east a group known as the Dravidian: and over the whole north and west a prevailing group of Aryan origin. The population is classed under these three groups in the following proportions:—

| | | |
|---|---|---|
| Talking Tibeto-Burman languages | 3 | per cent. |
| " Dravidian languages | 20 | " |
| " Aryan languages | 75 | " |

The languages of Tibet and Burma belong to what is known linguistically as the Tonic or Isolating group of languages, and they include the various tongues of the numerous and interesting wild tribes who inhabit the north-eastern frontier. The only languages of this group within the boundaries of the Indian Empire which have any literature of importance are the Burmese and the Tibetan (British India includes a small corner of Tibet in the districts of Lahoul and Spiti, and the Maharaja of Kashmir now rules the rest of the former Tibetan Kingdom of Ladak).

The Dravidian tongues represent a further stage in linguistic progress and are of the "agglutinative" class. In this group are four main languages: the Telegu of Northern Madras, the Tamil of Southern Madras, the Malayalam of the Malabar Coast, and the Kanarese of Kanara, the uplands of Mysore and the Karnatic. Each of these languages has a literature of its own, and the Tamil writings are especially noteworthy. In the literary language, however, though the structure and most of the vocabulary are Dravidian, a considerable number of Aryan words have been introduced through the influence of the Brahmanic religion.

The Aryan group, to which the majority of the languages spoken in India belong, are the modern representation of the Prakrit or vernacular dialects into which the Sanskrit of the original Aryan immigrants from the north-west broke up in the course of the centuries of gradual conquest and occupation which succeeded from the Vedic times. Several of these Prakrit dialects received a literary form in the writings of the Buddhist and Jain reformers; but with the revival of Brahmanism, the parent of modern Hinduism, the Sanskrit language was alone employed for religious, literary and official uses. The modern dialects, the offspring of the popular Prakrits, thus in the course of time received a great accession to their vocabulary from the literary Sanskrit, although the grammar and inflexions, which alone are what determines the character of a language, remained Prakritic. The ancient Sanskrit and the literary Prakrits of Jain and Buddhist literature, like the classical languages of Europe, were synthetical in structure; the modern vernaculars, like those of modern Europe, are analytical. It has been supposed that the change gradually established itself under the influence of the Dravidian and Kolarian forms of speech which were absorbed by the Aryans in their career of conquest, but this hypothesis is doubtful. The phenomena of development in India are exactly analogous to those of Europe, and seem to represent a necessary progress inherent in human speech. Among the Aryan vernaculars seven are worthy of especial notice, *viz.*—(1) Hindi, spoken by 86 millions; (2) Bengali, spoken by 41 millions; and (3) Marathi, spoken by 19 millions; (4) Punjabi, spoken by nearly 18 millions; (5) Gujrati, spoken by 11 millions; (6) Uriya, spoken by 9 millions; (7) Sindhi, spoken by 2½ millions.

The Hindi language has in itself several very marked dialects, and from it, with a large substitution of Persian and Arabic for the original Prakritic vocabulary, has arisen an eighth language known as Hindustani or Urdu, which originated in the immediate surroundings of the Moghul Courts, and which has now spread as a *lingua franca* throughout the areas where the Moghul influence prevailed, more especially in the towns and among the Muhammadan population, and is indeed the means of communication among educated people throughout the greater part of India.

## RELIGIONS.

The maps following the language map below illustrate the distribution of the chief religions of India which are:—

| | *Population.* | *Percentage on total.* |
|---|---|---|
| Animism | 9,000,000 | 3 |
| Hinduism | 208,000,000 | 72 |
| Buddhism | 7,000,000 | 2·5 |
| Jainism | 1,500,000 | ·5 |
| Sikhism | 2,000,000 | ·7 |
| Muhammadanism | 57,000,000 | 20 |
| Christianity | 2,300,000† | 3 |

* The map illustrative of the languages of India is by the kind permission of Messrs. Constable based for the most part on the corresponding map, prepared under the orders of Mr. J. G. Bartholomew, in Constable's Hand-Atlas of India. Some important modifications have, however, been made.

† Including Portuguese and French India the number is 2,600,000.

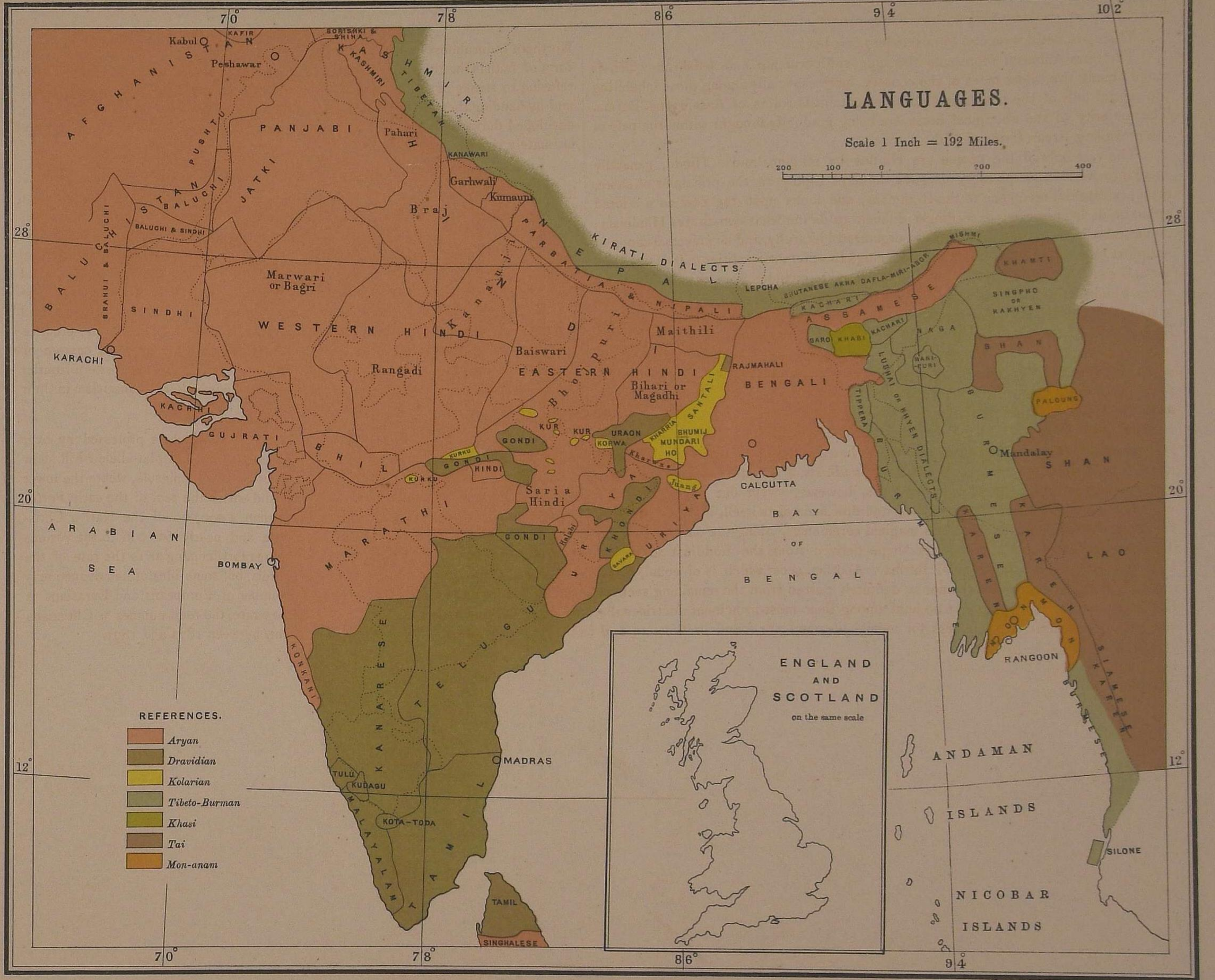
There are besides 90,000 Parsis and 17,000 Jews.

The term Animism represents the rude spirit-worship and fetishism which is found among the wilder races of the country, more especially among those inhabiting the central hills of the peninsula and the mountainous tracts of Assam and Burma. The majority of the aboriginal races are being gradually brought within the pale of the prevailing Aryan forms of faith.

The vast bulk of the people are Hindus by religion, and a Hindu, generally speaking, worships a plurality of gods, adheres rigidly to the principles of caste, attaches especial reverence to the Brahmans, and looks upon the cow as a sacred animal. It is, however, exceedingly difficult to define what constitutes Hinduism; and as there is no central authority, no organized hierarchy, and no universal canon of scripture, the term has very different meanings in different localities. In its character as a caste organization, Hinduism in some tracts excludes from its pale the menial races which in other tracts are recognized as belonging to it. As a purely religious system, however, it is characterized by an all-embracing tolerance as remarkable as that of classical paganism in Southern Europe, and it recognizes as belonging to itself not only the rudest forms of fetish worship, but also the highest developments of pantheistic and dualistic philosophy. It is a vast congeries of sects or classes which differ from each other on various points of doctrine or observance, but which, as a rule, have little anxiety to force their respective peculiarities upon others. Some of these sects, however, have from time to time displayed a missionary activity. One of the earliest in date and one which has, from its special vitality, separated itself most widely from the parent stock, is *Buddhism*, a re-action against the power of caste and of the Brahmans,—which was, however, swept out of India by the returning wave of Brahmanical influence, and now maintains itself, in a form more or less degraded by animistic ideas and magical ceremonies, along the outskirts of the Thibetan mountains and, in a purer shape derived from the Buddhist schools of Ceylon, in the outlying province of Burma. Another sect which is of equal, if not greater, antiquity, but which has not so definitely parted from the remaining sects of Hinduism, is that of the *Jains*, who hold among their most prominent doctrines the necessity of an extreme carefulness for animal life, and are found in Western and Northern India almost exclusively among the mercantile classes. A much more recent form of faith is that of the *Sikhs*, who by breaking down the barriers of caste and by refusing to smoke or to cut their hair became distinguished from their co-religionists, and by banding themselves to oppose the Mussulman dominion in Northern India, developed during the last century into a remarkable form of militant Hinduism and ultimately into something very like a new nationality.

In Muhammadanism we find the most prominent of the alien religions of India; its adherents are to some extent by origin foreigners from Western and Central Asia, but the majority are converts or the descendants of converts from the indigenous religions. The Muhammadans are found for the most part either in the north-west of India, where the influence of the alien invaders was strongest, or in Eastern Bengal and along the sea-coasts where Islam was fostered by foreign traders or pirates and by a repugnance among the people to Brahmanical ascendancy. The tenets of the Indian Muhammadans are in the main those of their co-religionists elsewhere, and the great majority of them are Sunnis of the school of Abu Hanifah; but in practice they mingle with their religious practices a considerable adherence to the custom of the Hindus among whom they live: and, except along the extreme western frontier and in certain small sects, there is on ordinary occasions little real fanaticism in their nature.

The other great alien faith in India is Christianity, which is professed by over 2,000,000 of the native community. A reference to the third plate below will show that these are found for the most part in the south of the peninsula, where the lower classes felt strongly the yoke of Brahmanism, and where the zeal of the early Portuguese Missionaries found its first field. More than 1,200,000 of the Native Christians of India belong to the Church of Rome and nearly 600,000 to the various reformed churches. There are no accurate figures forthcoming as to the rate of the progress of Christianity among the natives of India, but some idea of its advance may be obtained from the fact that, although the number of Europeans and Eurasians is known to have increased at a comparatively slow rate, the total number of Christians of all races increased by more than 50 per cent. between 1872 and 1891.

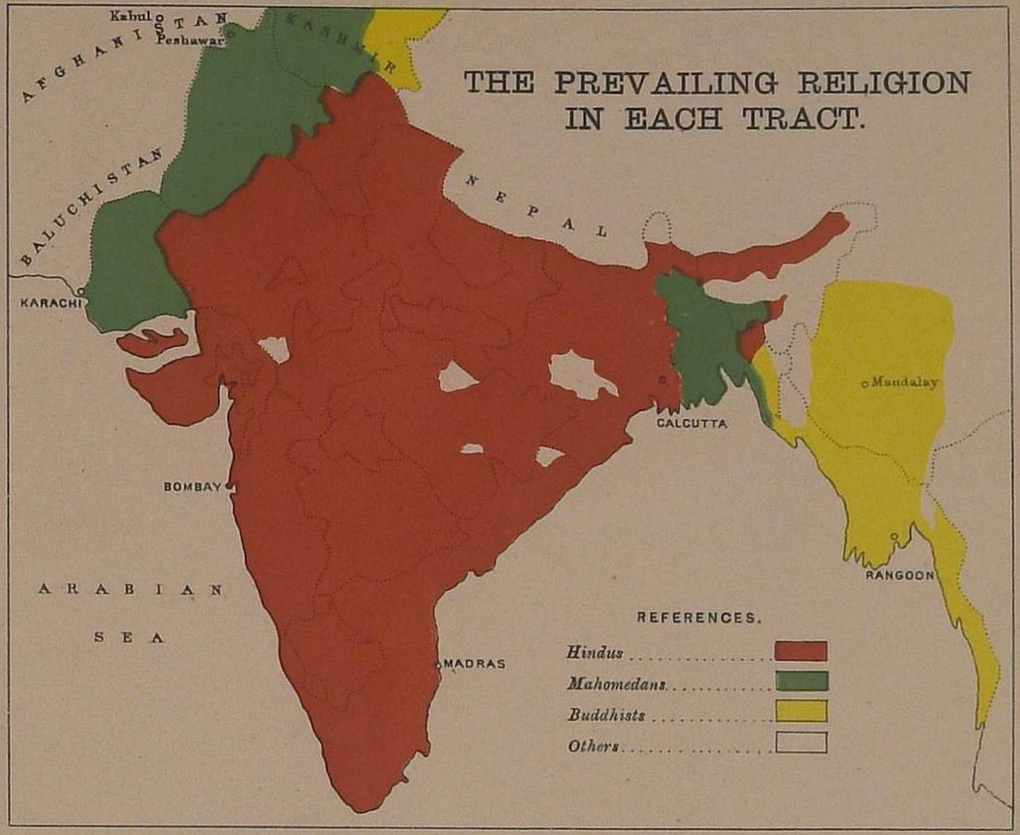


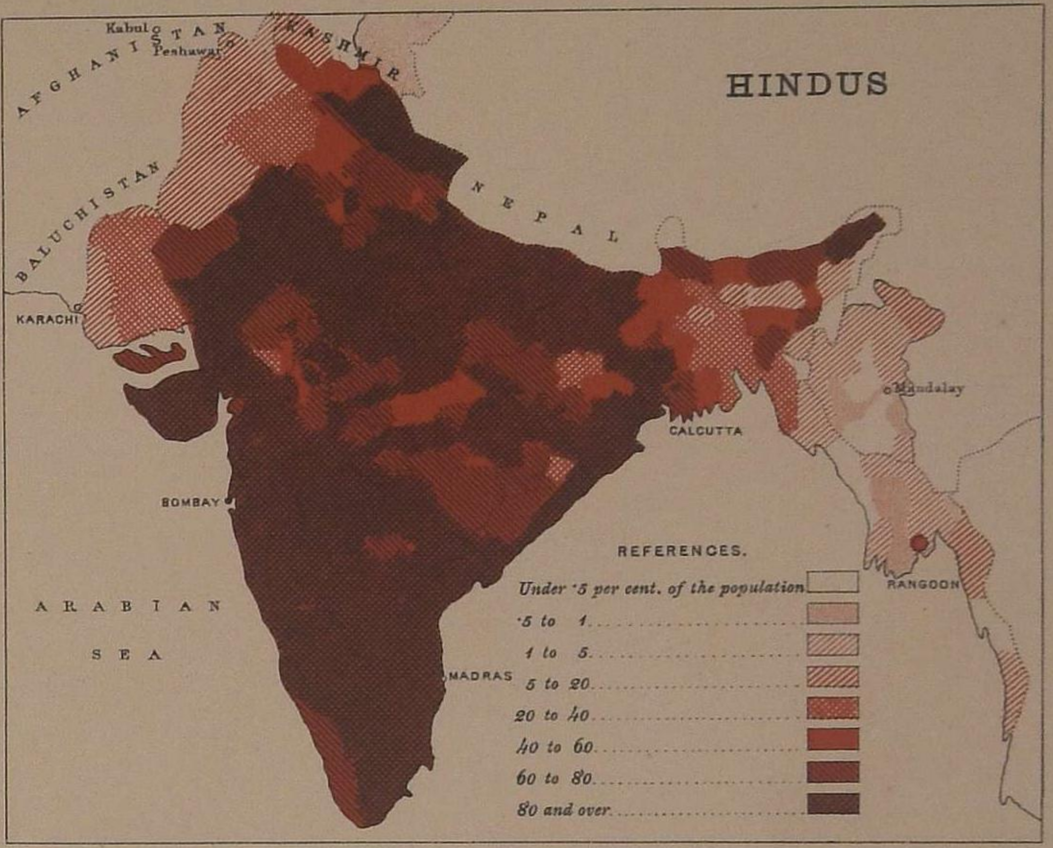

Reg. No. 489, R. & A.—Jan. 95.—2,016

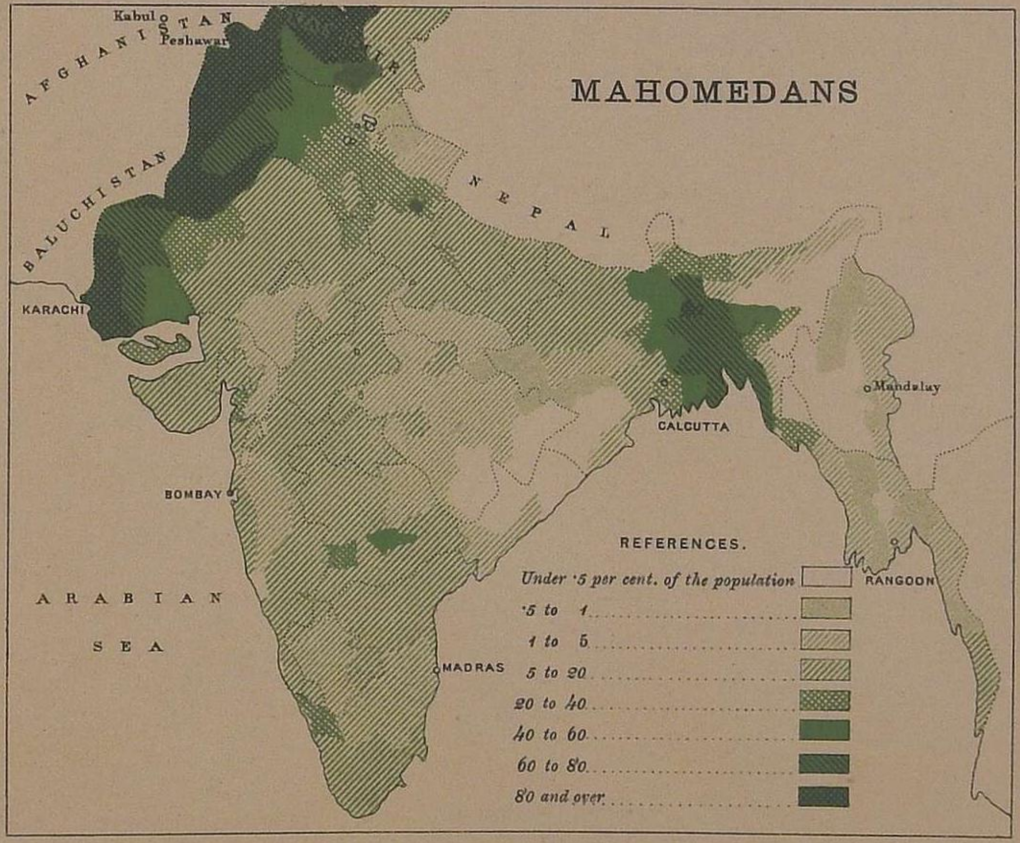
NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

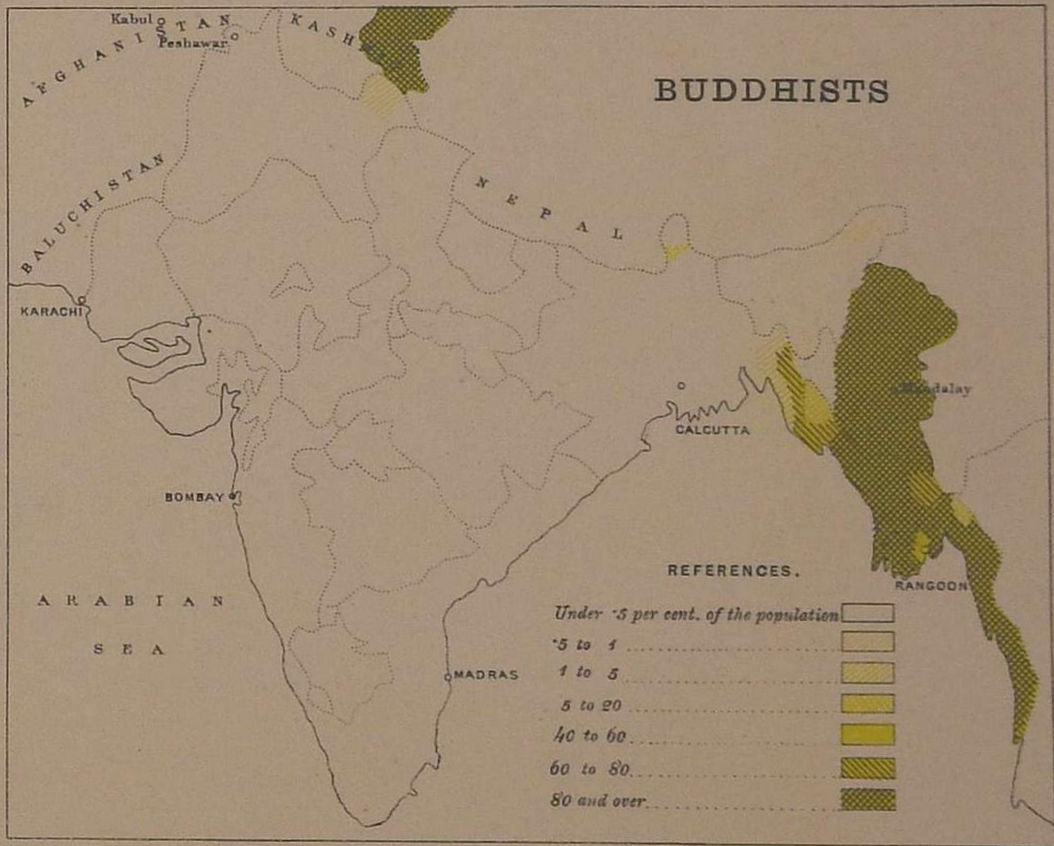
Litho., S. I. O., Calcutta.

# RELIGIONS.



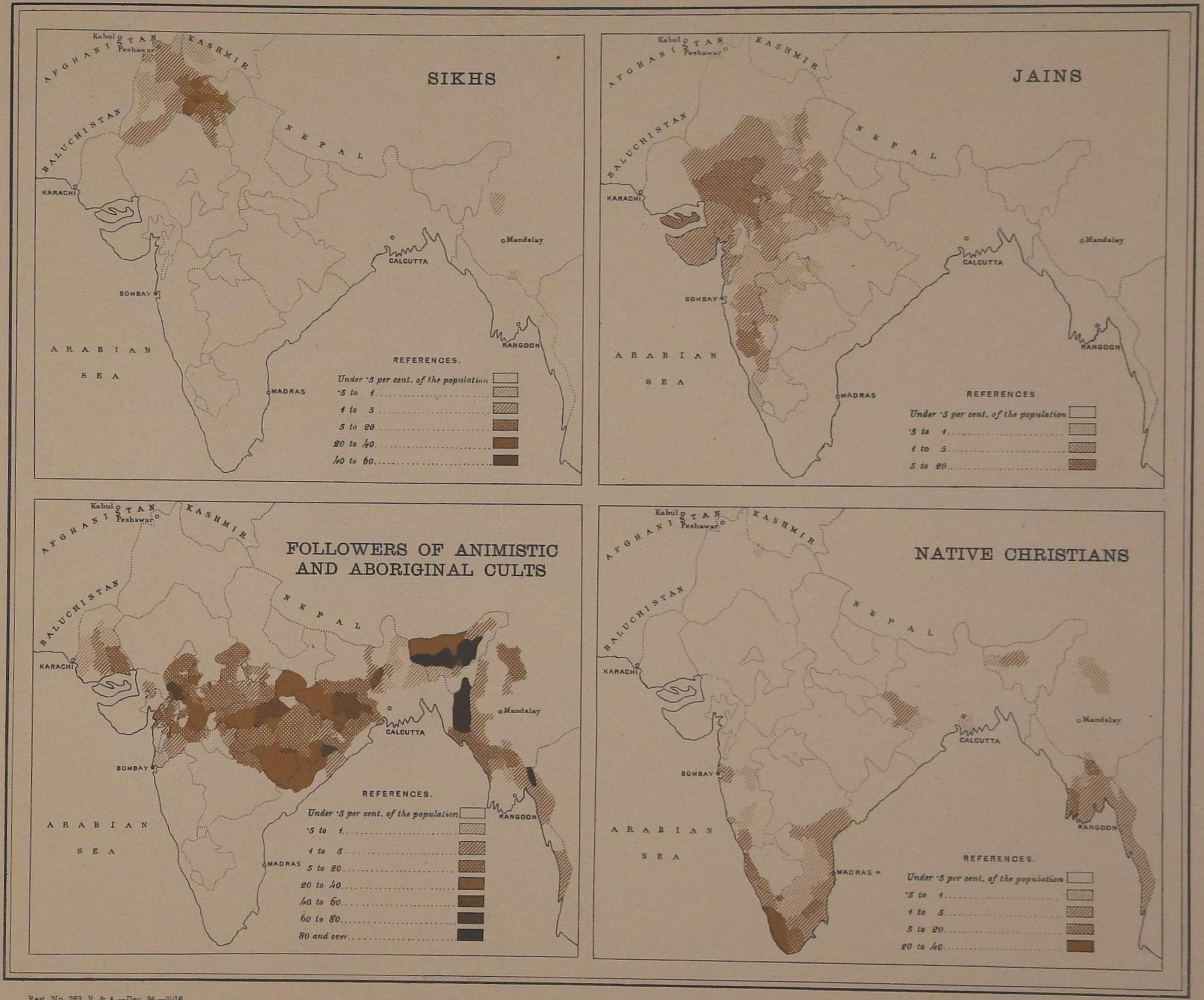




Reg. No. 271, R. & A.—Nov. 94.—2,016.

Litho., S. I. O., Calcutta.

# RELIGIONS.

(SHEET 2)




Reg. No. 253. R. & A.—Dec. 94.—2016.

Litho., S. I. O., Calcutta.

# CHAPTER XVII.

# PUBLIC INSTRUCTION.

SINCE their first appearance in authentic history, the Indians have always enjoyed the reputation of being a learned people. The Brahmans, it is true, confined their teaching of the *Shastras* to their own and the other two "twice-born" castes, making it penal to communicate any but elementary knowledge to the servile and mixed multitude; but the Buddhis reformation placed religion and education on a more popular basis. After the Musalman conquest the mosque became a centre of instruction and of literary activity. Education alike among the Muhammadans and the Hindus was based upon religion and supported by endowments and bequests for religious objects. When the East India Company first received charge of Bengal from the Delhi Emperor, it aimed only at discharging the duties fulfilled by the previous ruling power. Since the publication of Lord Auckland's minute of 1839, however, education in India has proceeded upon the recognition of the value of English instruction, of the duty of the State to spread Western knowledge among its subjects, and of the valuable aid which missionary and philanthropic bodies can render in the task.

In 1854 the education of the whole people of India was definitely accepted as a State duty, and the Court of Directors laid down with fulness and precision the principles which were to guide the Government of India in the performance of this task. Their despatch of 1854 still forms the charter of education in India: and after the East India Company itself had disappeared, its principles were confirmed by the Secretary of State in a despatch of the 7th April 1859.

*State system of education.*—In every province there exists a Department of Public Instruction under a Director who, with a staff of Inspectors, supervises the working of Departmental Schools and those aided by Government. A net-work of schools has been spread over the country, graduated from the village *páthsálás* to the highest colleges. All receive some measure of pecuniary support on the condition of regular Government inspection, while a series of Primary, Middle, and Entrance scholarships have paved a way to the University for the children of the poor.

In reviewing the recommendations of the commission which was appointed to consider education in India in 1882-83, the Government of India laid down that wherever private enterprise was ready to take its place, the Government Department should withdraw its own schools in favour of aided institutions, at the same time strengthening its machinery for inspection, as a grant-in-aid system postulates a thorough inspection of all institutions brought under it. In Bengal, where the number of State-aided schools and the staff employed on inspection duties is far larger than in any other province, there are upwards of 900 inspecting school-masters, pandits, and gurus. Besides Inspectors and Assistant and Deputy Inspectors, Female Inspectors have also been appointed in several provinces.

*Educational statistics, 1882-83 to 1891-92.*—In the general enumeration of educational institutions in India are included a large number of private schools or institutions which do not come under the definition of public institutions as schools or colleges in which the course of study conforms with the standard prescribed by the Department of Public Instruction or by the University, and which either are inspected by the Department or regularly present pupils at the public examinations held by the Department or the University. In 1882-83, the number of inspected schools and colleges of all classes in British India was 109,216, with an aggregate of 2,790,773 scholars, showing an average of one school to every 8 square miles of area, and one pupil to every 71 of the population. Male pupils numbered 2,628,402 in 1883, showing one boy at school to every 38 of the male population, and females 162,371, or one girl at school to every 610 females. These figures, however, only include State-inspected or aided schools and pupils. In 1891-92 the grand total of educational institutions was 141,793, of which 102,676 were public institutions. The aggregate number of scholars was 3,856,821, the number of boys and girls, respectively, being 3,517,778 and 339,043. The number of pupils attending public institutions was 3,348,910, and the number attending private institutions 507,911. Of the 3,856,821 scholars above mentioned, 63,340 (58,519 boys and 4,821 girls) are contributed by Upper Burma. For the purpose of considering the bearing of these statistics on the total population of a school-going age, the proportion of children of school-going age is taken at 15 per cent. of the total population. In 1892 one child in every 9, and one girl in every 50 of a school-going age, was at school. The percentage of children at school is lowest in the North-Western Provinces and Oudh, where it sinks to four. According to the Census of 1891, British India covered 964,993 square miles, and there was, therefore, on an average, one school to about 6½ square miles of area. Of the aggregate number of scholars, 10·9 per cent. and 8·2 per cent., respectively, are learning English or a classical language. The maps appended to this chapter are intended to illustrate the state of education in the various parts of India. It will be seen that in Bengal, out of a population of 71,239,701, some 160,000 persons are able to read and write and know English; about 720,000 persons are under tuition; about 2,960,000 are literate, and the rest (about 67,399,000 persons) are illiterate. In the North-Western Provinces and Oudh, out of a population of 46,905,085, some 80,000 are able to read and write English; about 220,000 are under tuition; 1,280,000 are literate, and about 48,405,000 persons are illiterate. In the Madras Presidency, with a total population of 35,306,474, there are about 88,000 persons able to read and write English; about 320,000 are under tuition; about 2,472,000 are literate, and about 32,426,000 persons are illiterate. In the Punjab (population, 20,866,847), about 40,000 persons are able to read and write English; about 140,000 are under

tuition; about 660,000 are literate, and about 20,026,000 persons are illiterate. In the Bombay Presidency (population, 18,857,044), 80,000 persons are able to read and write English; about 360,000 are under tuition; 880,000 are literate, and about 1,320,000 are illiterate. In the Central Provinces (population, 10,784,294), about 20,000 persons are able to read and write English; about 64,000 are under tuition; about 236,000 are literate, and about 10,464,000 persons are illiterate. In Assam (population, 5,435,243), about 10,000 persons are able to read and write English; about 26,600 are under tuition; about 176,600 are literate, and about 5,221,900 are illiterate. In Lower Burma (population, 4,658,627), about 5,000 persons are able to read and write English; about 133,300 are under tuition; about 980,000 are literate, and about 3,540,200 persons are illiterate. In Upper Burma (population, 2,946,933), about 5,000 persons are able to read and write English; 80,000 are under tuition; about 555,000 are literate, and about 2,306,900 persons are illiterate. In Berar (population, 2,897,491), about 53,300 persons are under tuition; 80,000 are literate, and about 2,764,000 persons are illiterate. In Ajmir (population, 542,358), about 26,600 persons, are under tuition; about 53,300 are literate, and about 462,000 persons are illiterate. Coorg, with a population of 173,055, contains about 26,600 literate persons, and the rest are illiterate. The number of girls at school is, in Bengal, about 100,000 out of a total of 5,360,000 of the school-going age; in the North-Western Provinces and Oudh, only about 13,300 out of 3,200,000; in the Madras Presidency, about 80,000 out of 2,880,000; in the Punjab about 20,000 out of 1,440,000; in the Bombay Presidency, about 40,000 out of 1,320,000, and in Lower Burma, about 20,000 out of 280,000. The map representing the state of public instruction in India shows that 20 per cent. or more of the total population of the school-going age are at school in public institutions in Lower Bengal, the towns of Madras and Ootacamund, small tracts in the Southern and North-Western portion of the Bombay Presidency, the city of Bombay, the towns of Rangoon and Mandalay, and a small tract in the North of Lower Burma. The percentage in all other parts of British India is less, and in large portions of the country, chiefly in the North-Western Provinces and Punjab, less than 5 per cent. of the children are under instruction in public institutions.

*Educational finance, 1891-92.*—The total expenditure on public instruction in 1891-92, was 305 lakhs of rupees. Of this amount, 88 lakhs were contributed from Provincial revenues, 68 lakhs from Local and Municipal Funds, and 149 lakhs were obtained from the public as fees, contributions, endowments, and the like. The great growth in the proportion of the expenditure borne by the public within the past five years (from 117½ lakhs in 1886-87 to 149 lakhs in 1891-92) is a most encouraging indication that the people have determined to undertake the responsibilities which properly rest on them in the matter of education.

*The Indian Universities.*—Four Universities (*viz.*, those of Calcutta, Madras, Bombay, and the Punjab) existed in 1883. A fifth (at Allahabad) was established in November 1887, and 2,909 candidates have since passed the Entrance Examination of this University, and a number of colleges have been affiliated. All the Indian Universities grant the Degrees of Bachelor and Master of Arts; the Bombay University grants the Degree of Bachelor of Science: in the Punjab University the Degrees of Bachelor, Master, and Doctor of Oriental Learning, are also bestowed. In the Universities of Calcutta, Madras, and Bombay, a system has been introduced under which the privilege of electing, subject to the approval of the Chancellor, a proportion of the Fellows has been conferred on the Masters of Arts and holders of equivalent degrees. Generally speaking, the proportion of graduates who take the degree of M. A. is very small; the largest number of such degrees are taken at the Calcutta University. The Punjab University is a teaching as well as an examining body.

*Collegiate education.*—The total number of colleges in 1891-92 was 139, and the number of students was 16,172. There were 104 English and Oriental Arts Colleges attended by 12,985 students; 27 Law Colleges attended by 1,925 students; 4 Medical Colleges attended by 778 students, and 4 Engineering Colleges attended by 484 students. It is the policy of the Government to maintain at the head-quarters of each Local Government an Arts College teaching up to the highest standard, and the most important Government Colleges are those at Calcutta, Madras, Bombay, and Allahabad. Of the 27 Law Colleges, 12 are in Bengal, 7 in the North-Western Provinces and Oudh, 4 in the Bombay Presidency, 2 in the Central Provinces, and one each in the Madras Presidency and the Punjab. There are also 2 Law Schools in Assam; the Medical Colleges are at Madras, Bombay, Calcutta, and Lahore, and the Engineering Colleges at Madras, Poona (Bombay Presidency), Seebpore (Bengal), and Roorkee (North-Western Provinces and Oudh).

*Secondary education.*—Secondary education, which is imparted in Middle Schools (giving superior instruction through the vernacular and the English medium) and in High Schools (teaching, generally in English, up to the Collegiate Entrance Standard), was considered by the Government in 1888 to be already established on a sound and prosperous footing. In 1891-92 there were 4,438 schools for boys and 438,988 students, 302,019 of the students being in the exclusively English Division. Advanced private schools and students numbered 5,559 and 69,051. Secondary schools teaching English to boys numbered 2,544, of which 755 were High Schools and 1,789 Middle Schools. The principle has been accepted by the Government that the Education Department should gradually withdraw from the direct management of Secondary Schools. Aided Secondary Schools for boys were 1,381 in number (11 being in Upper Burma), and there were 536 Unaided Schools. Most of the expenditure on English Secondary Schools for boys is paid from fees. The amount so met in 1891-92 was R36,81,049. The percentage of the total expenditure met from private sources was 72.

*Primary education.*—The education of the great mass of those who attend Primary Schools stops at this stage, while for a comparatively few it leads up to the higher stages. In Bengal and Assam the Primary Department of the High and Middle Schools fulfils the latter purpose, and the systems in the North-Western Provinces and Burma include a corresponding arrangement. In Bombay two classes, corresponding to Lower Middle Classes elsewhere, are considered Primary, and add, therefore, to the number of the Primary students. The total number of public Primary Schools for boys was 91,881 in 1891-92, and the number of scholars has shown a progressive advance every year. Fifty-three per cent. of the entire number of primary scholars are now studying in Aided Schools. Unaided Schools are those which have adopted the departmental methods of instruction, and (as a rule) look forward to being eventually included in the list of those receiving aid. A leading feature of the Primary Schools in Burma is the large proportion of schools which contain both boys and girls. The schools attached to the Buddhist Monasteries admitted boys only, but these are said to be decreasing. In Upper Burma, where the work of the Department commenced in 1889-90, there seems to be a great

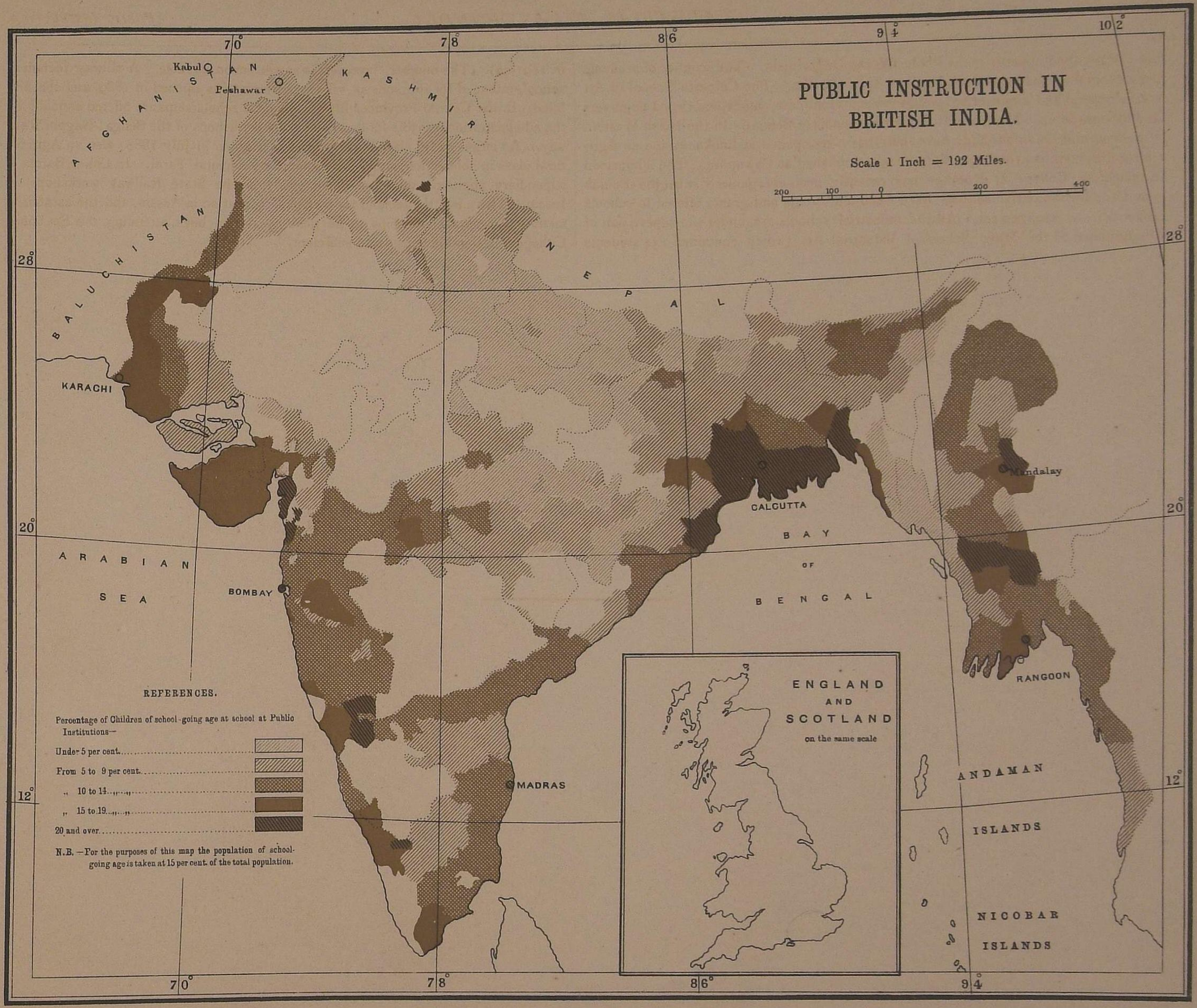
demand by the people for a better secular education. The Education Commission of 1882 expressed with emphasis the view, which was approved by the Government of India, that the elementary education of the masses was that part of the educational system to which the efforts of the State should be directed in an increasing measure. Primary education, it was added, possessed an almost exclusive claim upon Local Funds set apart for education, and a large claim on Provincial revenues. In 1891-92 the total expenditure from public funds (*viz.*, Provincial revenues, District and Municipal funds) was R49,29,551. In addition to the direct expenditure on Primary Schools, there is the expenditure on training teachers for employment in such schools, which, in 1891-92, amounted to R5,72,405. In that year the amount contributed from Municipal funds in the whole of India towards expenditure on Primary Schools for boys was R4,90,378, and that contributed by Local Funds R28,49,553. The expenditure from fees was R27,45,075. Fees in Primary Schools are charged in most provinces to all pupils able to pay them; but the levy of fees from the children of those paying an educational cess, though recommended by the Education Commission, is not carried out at present in the Punjab, owing to the opposition of the agricultural community, and where the schools have been entrusted to District Boards under the measures connected with Local Self-Government, it has been in several provinces made discretional with the Boards to levy fees.

*Female education.*—In 1891-92 the total number of public Primary Schools for girls was 5,228, and they were attended by 157,183 pupils. The total number of Secondary Schools was 434, attended by 34,306 pupils. The number of girls at Secondary Schools for both boys and girls was 35,294. It is said that two-thirds of the girls attending private institutions are taught in Koran schools. In the North-Western Provinces and Oudh the percentage (0·32) of girls under instruction to the female population of school-going age is lower than in any other province. In most provinces there are a considerable number of little girls attending boys' Primary Schools, the number of whom in 1891-92 was 119,848. There were 45 female students on the rolls of Arts Colleges. The only province which possesses a special college for girls teaching up to the B. A. standard is Lower Bengal. The charges met from fees have risen to R6,25,350, and public expenditure is now only 35·7 per cent. of the cost. The increase in fees, however, has taken place mainly in European girls' schools. A rapid increase of girls under education in the Madras Presidency has followed on the establishment in 1888-89 of a special inspecting staff for girls' schools, though the increase as yet is chiefly in the lowest stages of instruction. In all provinces higher grants are given to girls' schools than to boys' schools, and on easier terms. The examination in subjects suitable for girls as an alternative to the Matriculation Examination which was recommended by the Education Commission, has not yet been established in any province; but a higher examination for women exists in Madras, and there is a separate examination for European girls in several provinces. Very few girls reach the moderate standard of general knowledge required for admission to training schools for female teachers. A "training school and home," especially for Hindu widows, has been established at Beranagar in Bengal, and an institution of a similar character at Poona.

*Normal and other special schools.*—The view of the Education Commission of 1882-83 was that there should be a Normal School, that is, a school for training teachers, in each Inspector's circle, and the Government of India in 1887 insisted on the importance of maintaining properly conducted schools for teachers. In 1891-92 there were 115 training schools for masters with 4,353 pupils, and 37 training schools for mistresses with 793 pupils. The outlay from the revenues of the various provinces on schools for masters under public management was R3,31,470. A large share of the cost of training mistresses is borne by Missionary Societies. Most of the training schools in Madras were under the control of District Boards till the end of 1890-91; but the results of this system were found unsatisfactory, and all but two of the schools have been transferred to the charge of the Education Department. In the North-Western Provinces and Oudh no practising schools have been attached to the training schools, as is considered advisable in all other parts of British India. The Bengal Government, owing to want of funds, substitutes, instead of Normal Schools for the training of teachers of Lower Primary Schools, a system of instructing these teachers or *gurus* by means of moveable schools (training the *gurus* of one locality and then moving elsewhere) and classes for *gurus* attached to certain selected Middle Schools. Effective measures appear to have been taken in Madras and in the North-Western Provinces for diminishing the number of uncertificated teachers in charge of schools. Similar steps are being taken in other provinces, and, generally speaking, the supply of Normal Schools seems to be sufficient to provide teachers at least for Middle and Upper Primary Schools. The main difficulty with regard to providing trained female teachers is said to be in the reluctance of Hindu and Muhammadan young women to accept this employment.

*Technical Education.*—The subject of technical education was brought prominently to the notice of the Provincial Governments in 1886, and it was recommended that drawing and introductory science should be studied in all Middle and High Schools; that there should be a practical or "modern" side in high schools, and that a "modern" University Entrance Examination should be adopted as recommended by the Education Commission. It was suggested that special schools in the various departments of Arts should be established; that a technical branch to teach and improve a local industry should be attached in some places to Middle and High Schools, and that the whole body of technical institutions should be systematized and placed under central colleges to be affiliated to the University. The technical schools in the Madras Presidency are the School of Arts, the Victoria Technical Institute, and the College of Agriculture at Saidapet. There were 426 students at the School of Art in 1891-92, and the institution seems to be flourishing and useful. Numerous industrial schools (often charitable institutions) exist in Madras, but in many of them boys are simply being trained to trades. In Bombay the "Reay Art Workshops" were, in 1890, added to the School of Art, and speedily received numerous apprentices in wood-carving and other artistic industries. The Victoria Jubilee Technical Institute at Bombay was opened to students in 1888. The course is calculated to train a student in three sessions to be a fair mechanical engineer. The Ripon Textile School, which is attached to the institute, had 1,148 students in all in four years, and all the Textile, and many of the engineering students who had completed the course, found ready employment. The Poona College of Science maintains classes in science, engineering, and agriculture, besides classes, independent of the University, for training subordinates of the Public Works and Forest Departments. A Veterinary College was established at Bombay in 1886. There were 16 Industrial Schools in this presidency in 1892, besides industrial classes attached to ordinary schools. In Bengal the Seebpore College provides instruction in engineering, and the Local Government now guarantees to graduates in engineer-

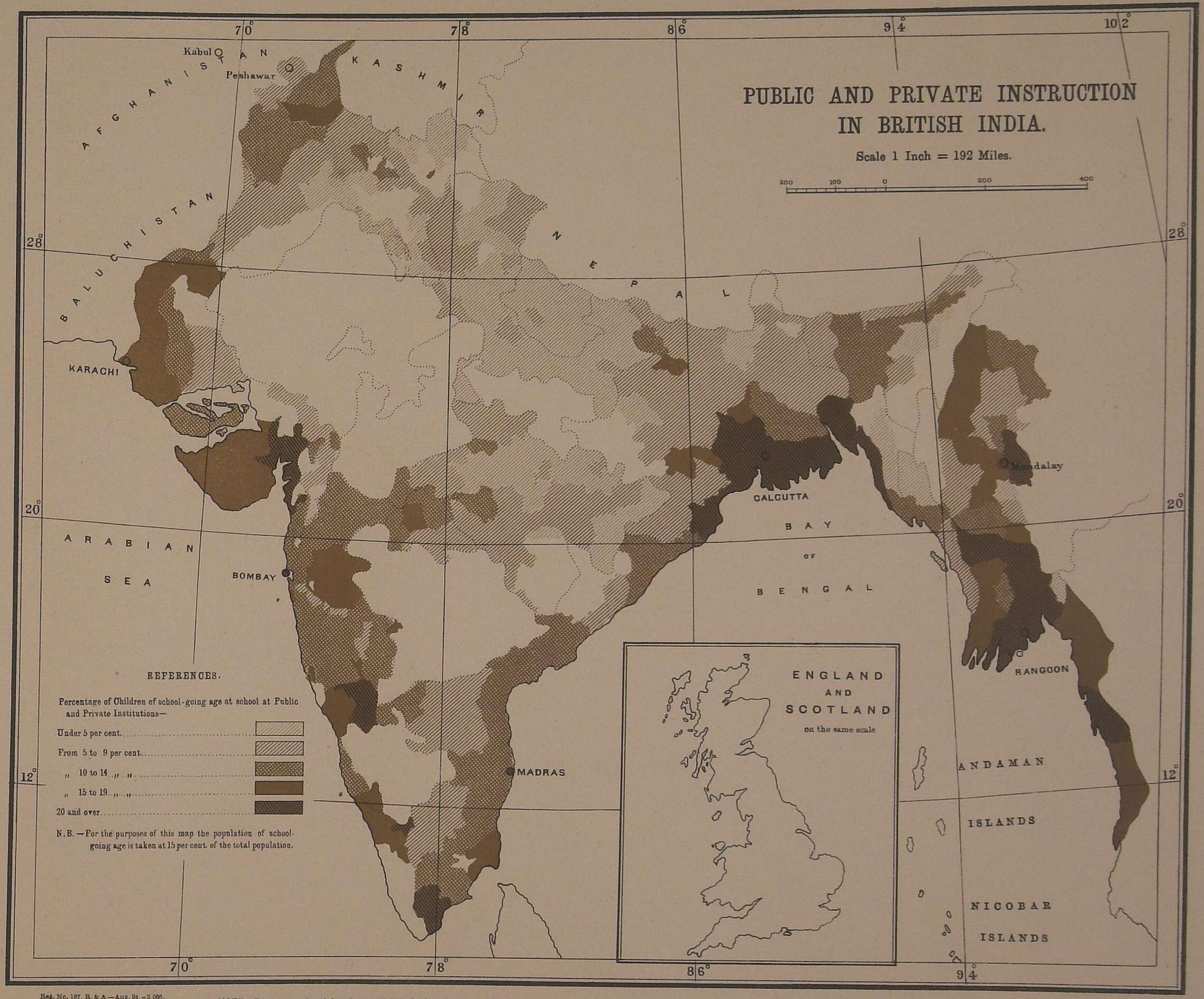
ing certain appointments in the Public Works Department. The number of students in the engineer classes at Seebpore was 87 in 1891-92. The Calcutta School of Art trains general and engineering draughtsmen, architects, modellers, wood engravers and lithographers. There are 21 industrial schools in Bengal. In the North-Western Provinces and Oudh an industrial school has been opened at Lucknow, and an Agricultural School has (during 1893) been established at Cawnpore. The Thomason Engineering College at Roorkee has recently been reorganized. In the Punjab standards for industrial schools have been drawn up, and grants offered to schools under private management. All the industrial schools are under the supervision of the principal of the Mayo School of Industrial Art (which contained 134 students in 1891-92). The number, however, is as yet inconsiderable. A railway technical school, intended for the sons of railway artisans, was opened in 1889, and speedily filled. In the Central Provinces fifteen technical scholarships are offered annually by the administration, tenable for two years in the workshops of the Bengal-Nagpur Railway. An engineering class was opened at Nagpur in July 1888; also an Agricultural class in connection with the Nagpur Experimental Farm. In Lower Burma 8 stipendiary apprenticeships are given yearly in the State Railway workshops at Insein. There is little demand for technical education in Assam, and the establishment of certain scholarships to be held by Assam boys attending the Seebpore College in Bengal is considered sufficient.




Reg. No. 197, R. & A.—Aug. 94.—2,066.

NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

Litho., S. I. O., Calcutta.



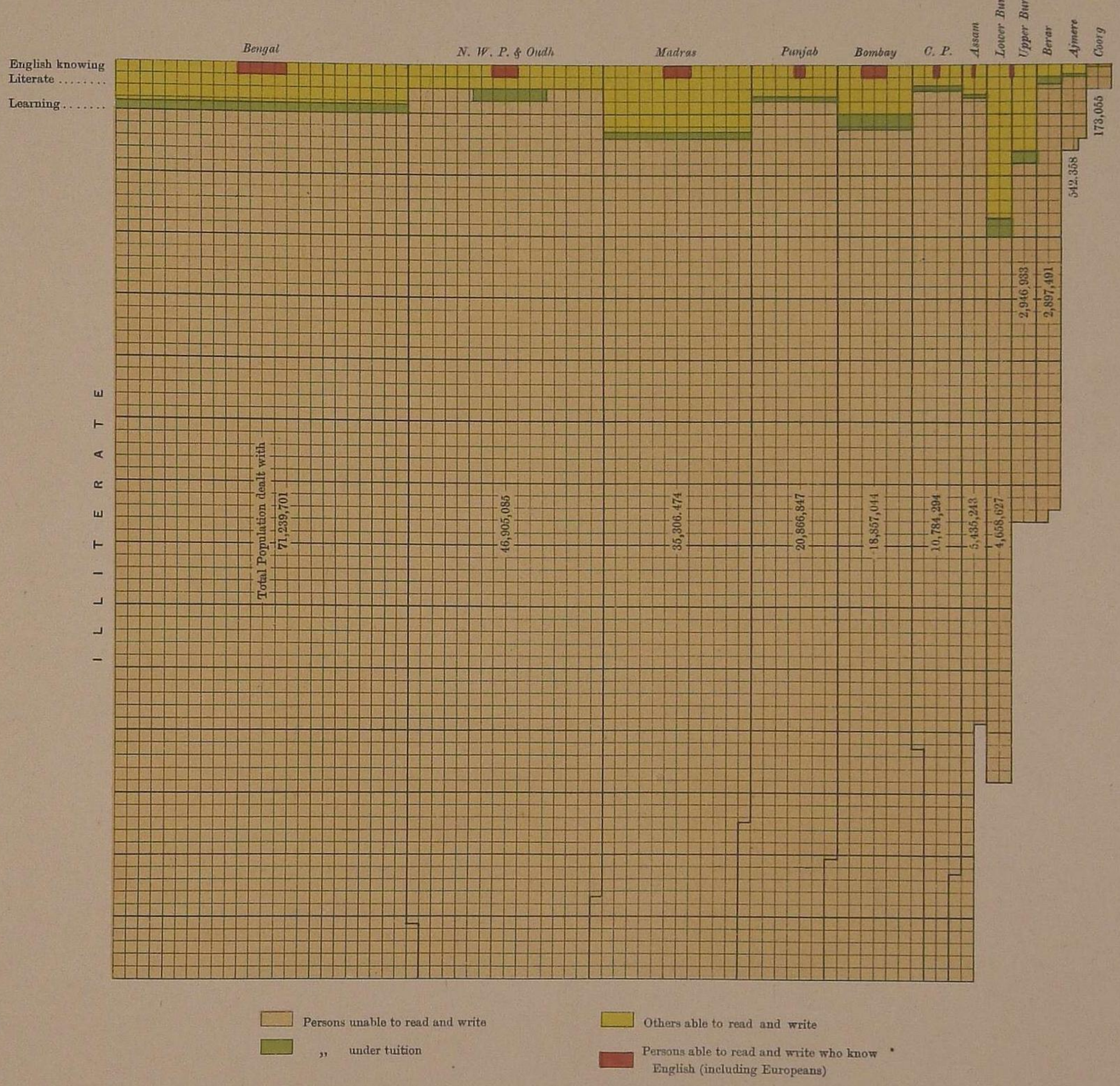

Reg. No. 197, R. & A.—Aug. 94.—2,066.

NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

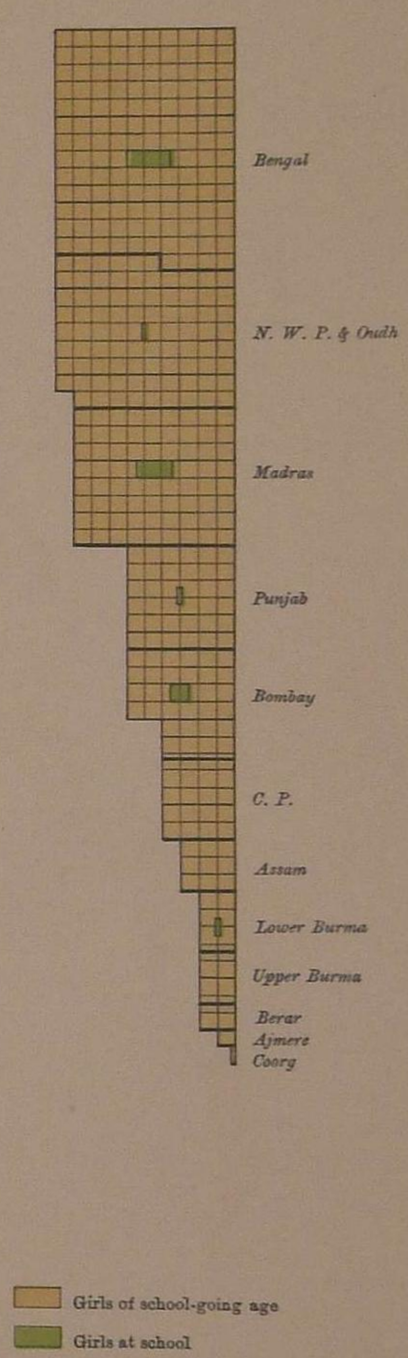
Litho., S. I. O., Calcutta.

# EDUCATION IN BRITISH INDIA

## AMONG THE POPULATION AT LARGE




## GIRLS AT SCHOOL




Reg. No. 326, R. & A.—July 94.—2,016.

Every small square represents 40,000 of the population.

Litho., S. I. O., Calcutta.

# CHAPTER XVIII.

# EMIGRATION.

THE density of the population in certain parts of the country has already been noticed in Chapter XV. One of the methods by which this density may be relieved is the emigration of the people either to other parts of India or to countries outside India.

But the native of India is not a ready emigrant. He has as a rule little of the commercial instinct: he finds it difficult to settle among men of strange language and race: and he is in many cases forbidden by his religious ideas from crossing the sea. In India itself he is often ready to move within a certain radius from his home or even to travel to considerable distances or temporary work on roads or harvest operations, returning to his home after a few weeks or months. But the chief difficulty remains that he is most unwilling to move from the overcrowded tracts to lands that are in need of labour, and this chapter is a record of the little that it has been found possible to do and the great deal that is still left to do for the encouragement of emigration in this direction.

In some few cases agriculturists have gone out to jungle areas which they have been induced to clear and cultivate, but the tracts in which this form of emigration has succeeded (as it has in Jagdispur, Chanchal, the Guma Dwar, and Charwa) are limited. A larger measure of success has attended the steps lately taken in the Punjab to colonize waste lands which have been brought under irrigation from Government canals. On the Sohag and Para, Sidhnai and Chenab canals in that province, an area of more than a thousand square miles has been so colonized, and there are still large tracts which can be similarly reclaimed.

The tea gardens of Assam have been the cause of a very considerable wave of emigration into that province, more especially from Behar and Chutia Nagpur. Local labour in Assam is sparse and unsatisfactory, and the tea cultivation is carried on by labourers or "coolies" from distant parts of India. As these labourers are, as a rule, unable to pay their way to the gardens, the expenses of their journey are defrayed by the planting community, in return for which the planters are allowed to retain the coolies under a penal contract for four years. The recruiting of these labourers, their wages, their treatment, their accommodation, the sanitation of their surroundings, the provision of medical attendance, and so forth are carefully supervised by the Government, and on the conclusion of their term of indenture a large number of the coolies settle down in the new country. Some 45,000 persons now emigrate under contract every year to Assam, and the coolie population under contract in that province in 1891 was 437,400, or 242,000 more than in 1881. The Assam emigration, however, does not relieve the congested districts only, for a large number of the labourers are recruited from the sparsely populated tracts of the Sontal Parganas and Chutia Nagpur, the inhabitants of which are stronger and better able to endure the Assam climate than labourers from the crowded areas of Behar and the North-Western Provinces.

The mill-labour in the town of Bombay attracts a large number of men from the dense population of the Bombay seaboard, and there is a very considerable temporary migration for harvesting operations between Madras and Ceylon, and between Chittagong and the adjacent parts of Burma, and again for road-making from the crowded tracts between Lucknow and Patna to Eastern Bengal and Central India. Emigration of a permanent character from India to Burma is yet in its infancy, though efforts have been made both by Government and by private capitalists to foster it.

Indian labourers emigrate to the Straits Settlements where their welfare is provided for by local legislation, and also to certain of the neighbouring States which have given similar guarantees for their well-being.

India is also the chief source of the labour supply of several of the British and Foreign colonies. In the British colonies there are 500,000 Indian labourers, of whom 40,000 are in Natal, 70,000 in Trinidad, 100,000 in British Guiana, and 250,000 in Mauritius. There are, besides, 6,000 in the Dutch colony of Surinam and 22,000 in the French colony of Réunion.

The usual practice is for the coolie to bind himself in India to an indenture for five years' service, in return for which he is provided with a free passage to the colony, and is allowed after remaining ten years in the colony to return to India free of charge.

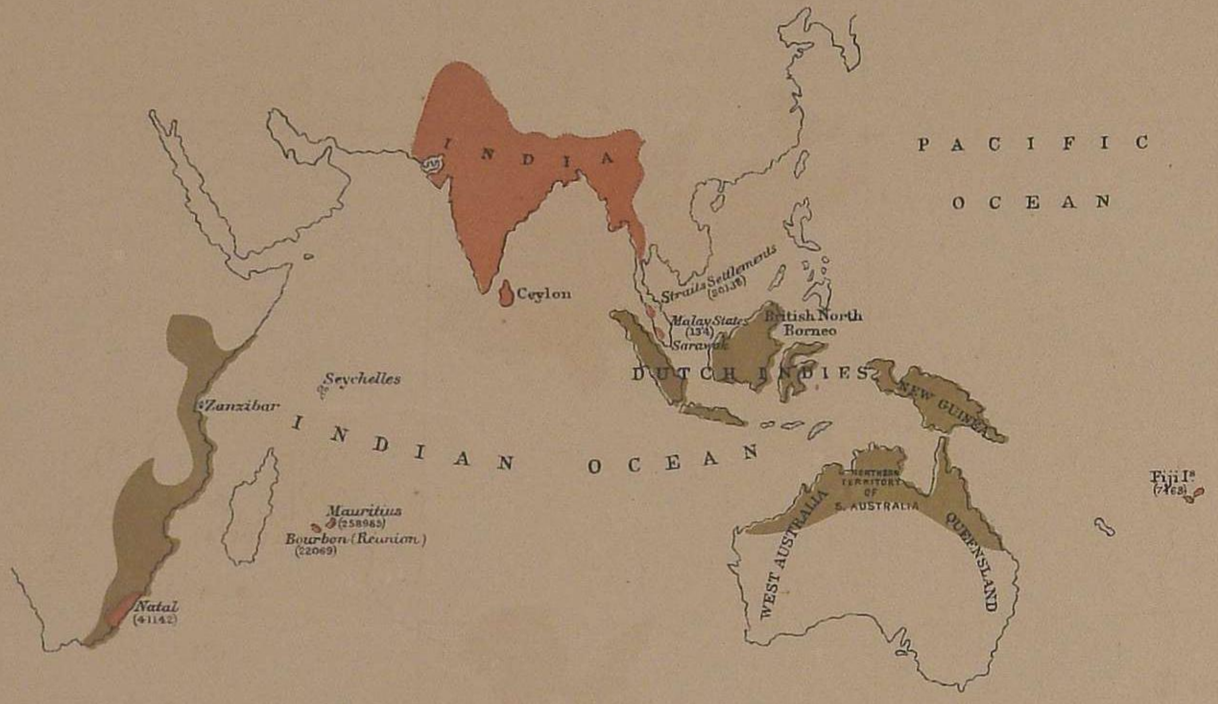
As in the case of Assam, the recruitment and transport of the emigrants to the colonies is carefully controlled by Government, and their welfare in the colonies is regulated by supplementary local legislation.

The Government of India are supplied with regular information as to the condition of the Indian labourers in the various colonies, and in more than one instance has barred emigration to colonies in which it had reason to suppose that the coolies were improperly treated.

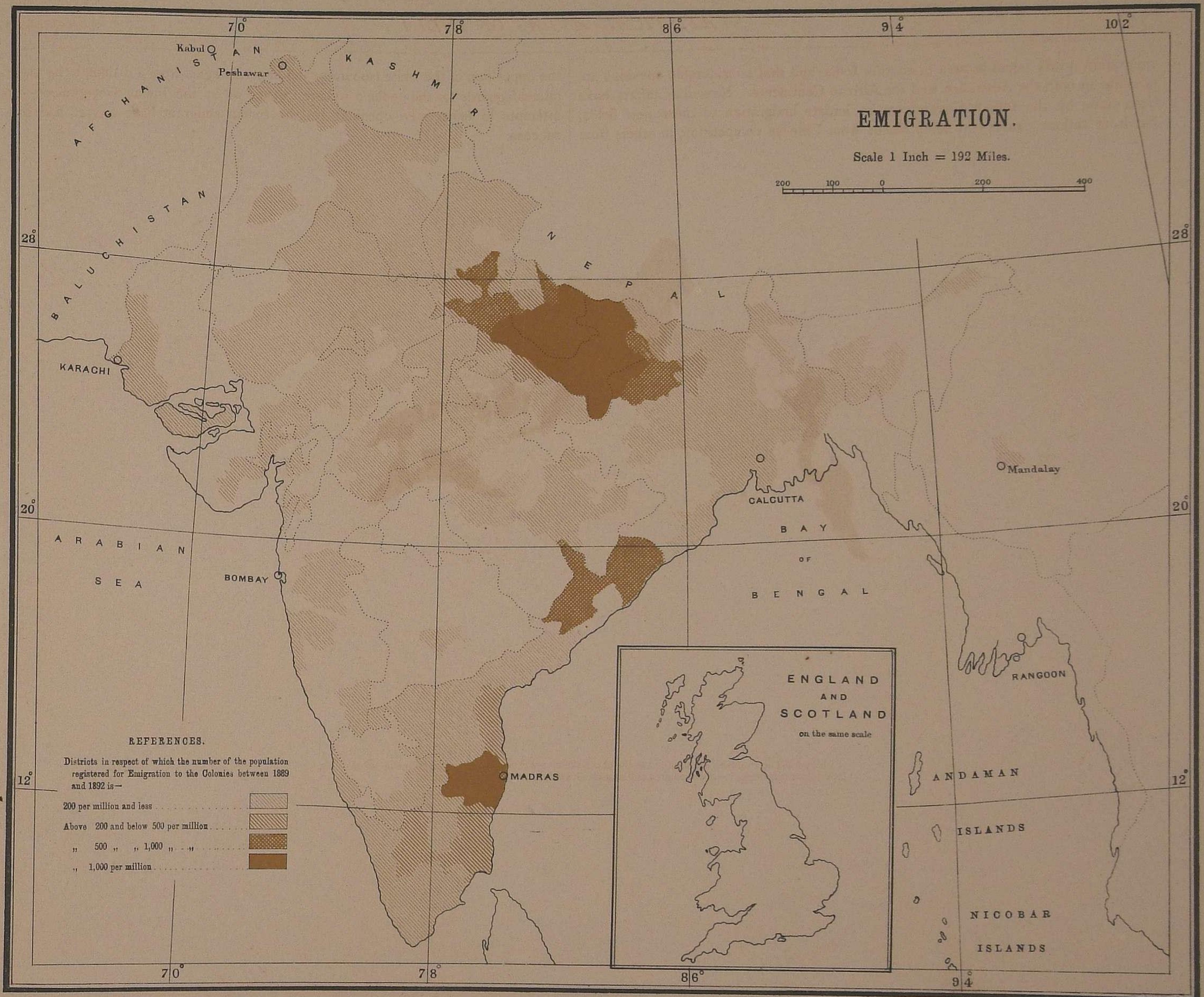
A comparison of the map attached to this chapter with that which represents the density of the population (Chapter V) will show that the colonial emigration is so far beneficial that it affects some of the most densely populated tracts of India. The total number of emigrants is, however, insignificant, the average for the last three years being 16,500 only. Of these many return to their homes, but as a rule the returning emigrants bring considerable savings with them, and the wealth thus introduced into the country exceeds R8,00,000 per annum.

It is obvious that this form of emigration—whether it be regarded as a means of reducing the population of congested areas or as a means of adding to the capital of the country—is one which deserves encouragement: and it is also clear that it has much scope for further development. An attempt has been made in the sketch map attached to show the large areas available in the tropical regions of the East where the white man cannot, as a rule, undergo manual labour. It will be seen that in the fertile and sparsely populated tracts of the Dutch Indies alone there is a field for

emigration nearly equal in area to another India, and that considerable openings are possible on both the Australian and the African Continents. Numerous efforts have been made by the Indian Government to initiate emigration to these new fields, but from various causes—in some places from Chinese competition, in others from the opposition of the white labourers, and in others again from a dislike to the elaborate safeguards for the coolie's welfare insisted on by the Indian Government—the attempts to foster new openings for the Indian emigrant have as yet had little success.




NOTE.—The countries coloured red in the above sketch are those already open to Indian labour: the black colour represents roughly the area still unutilized which is suitable for emigration.




Reg. No. 137 R. & A.—Sept. 94.—2,016.

NOTE.—For geographical detail consult the final map (British Provinces & Native States) which can be pulled out so as to lie alongside this map.

Litho., S. I. O., Calcutta.

# CHAPTER XIX.

# FEUDATORY STATES.

THE subjoined list contains the names of the principal ruling Chiefs in India. Including the rulers of the petty States which have not been separately named, there are 631 Chiefs. The degrees of sovereignty enjoyed by the rulers, the size, wealth, strength, and importance of the States, present an infinite variety. The internal administration, in the absence of exceptional and temporary circumstances, is, to an extent which varies with the measure of sovereignty enjoyed by each State, in the hands of its ruling Chief; but he owns allegiance to the British Government, and the Native States in India have no external relations.

Outside the confines of India there are States likewise having political relations with the British Government of different degrees of intimacy. Such are Maskat on the Arabian Coast of the Persian Gulf, Afghanistan, Nepal, and Bhutan, the statistics of which cannot be given with accuracy. As regards their external relations they are within the sphere of action of the Indian Government, and by geographical contiguity some are naturally brought into more or less close communion with the neighbouring districts of India.

The Native States—varying in area as they do from Hyderabad with 82,698 square miles and a population of 11,537,040 to places like Darkuti in the Punjab measuring 5 miles and containing 595 souls, or Bija, another petty State in the same province, with an area of 4 miles and a population numbering 1,171—form in the aggregate a very important part of India. In a total area which is computed at about 1,560,000 square miles, the Native States claim about 712,000 square miles; and of the total population of India, which, according to the census of 1891 and other returns, numbered 287,223,000, the Native States own something like 66,330,000.

As the degree of autonomy necessarily varies in so diversified a collection of States, so also does the channel through which their political relations with the Government are conducted. In this respect, however, geographical position as well as political importance is a factor, and the States are divided according as those relations are carried on directly with the Foreign Department of the Government of India, or with one of the several Local Gevernments and Administrations.

In the first class are Kashmir, Hyderabad, Mysore, Baroda, and the Baluchistan, Rajputana, and Central India Agencies. The last Agency includes in the first rank Indore and Gwalior, the territories of the Maharajas Holkar and Sindhia, and 141 other States, some of which are of trifling importance. The territories of His Highness the Maharaja of Jamu and Kashmir extend from the Punjab far into the mountain regions of the Himalayas, and touch on their further side independent and foreign territory; in area at least this State is the second in India. From the time when the Maharaja of Jamu was given the lands which British arms had won for him, his connection with the Punjab, before and after its final subjection, continued most intimate until, in 1885, a resident political officer directly under the Government of India was accredited to the State, and the Government of the Punjab ceased to have direct dealings with it.

The rights and the internal authority, the ceremonial and other relations of the different States with the paramount power are regulated by treaties or engagements and by old usage and tradition. Most of the large States possess some nominal military force, but these 'armies' are principally employed on police duties or for purposes of display. Selected contingents from their forces have, in the past few years, been placed by the leading States at the disposal of the Government of India, and have been formed into the fine body of auxiliaries known as the "Imperial Service troops."

| Name of State. | Name and title of Chief. | Age of Chief. | Area of State in square miles. | Population of State. | Military Force. | | | Salute of Chief in guns. | Date of succession of Chief. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cavalry. | Infantry. | Serviceable guns. | | | |
| **Having Political Relations direct with the Government of India.** | | | | | | | | | | |
| | | Years. | | | | | | | | |
| Baroda . . . | H. H. Maharaja Sir Sayaji Rao Gaekwar, G.C.S.I. | 29 | 8,569 | 2,415,396 | 3,500 | 4,988 | 34 | 21 | 27th May 1875. | |
| Hyderabad . . | H. H. Nawab Mir Sir Mahbub Ali Khan, G.C.S.I. | 27 | 82,698 | 11,537,040* | 5,968 | 24,102 | 25 | 21 | 26th February 1869. | * Excluding the Hyderabad Assigned Districts. |
| Jamu and Kashmir . | Colonel H. H. Maharaja Partab Singh . . | 43 | 80,000 | 2,543,952† | 531 | 6,482 | 267 | 19 | 12th September 1885. | † Including Gilgit, Skardu, and Punch. |
| Kalat . . . | H. H. Mir Mahmud Khan, C.I.E. . . . | About 29 | 106,000 | 220,500 | 300 | 1,500 | 6 | 19 | 15th August 1893. | |
| Mysore . . . | Colonel H. H. Maharaja Sir Chama Rajendra Wadiar Bahadur, G.C.S.I. | 30 | 27,936½ | 4,843,523 | 1,228 | 2,353 | 10 | 21 | 30th March 1868. | |
| *And Las Bela in the Beluchistan Agency.* | | | | | | | | | | |

| Name of State. | Name and title of Chief. | Age of Chief. | Area of State in square miles. | Population of State. | Military Force. | | | Salute of Chief in guns. | Date of succession of Chief. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cavalry. | Infantry. | Serviceable guns. | | | |
| **Having Political Relations direct with the Government of India**—*continued.* | | | | | | | | | | |
| **In Central India.** | | | | | | | | | | |
| Ajaigarh | H. H. Maharaja Ranjor Singh Bahadur | 44 | 802·30 | 93,020 | 97 | 544 | 9 | 11 | 9th September 1859. | |
| Alirajpur | Rana Partab Singh | 12 | 836·63 | 70,091 | 11 | 157 | 4 | 9 | 14th February 1891. | |
| Barwani | Rana Indarjit Singh | 53 | 1,362 | 80,264 | 17 | 227 | 3 | 9 | 15th August 1880. | |
| Bhopal | H. H. Nawab Shah Jahan Begam, G.C.S.I., C.I. | 55 | 6,784 | 954,901 | 510 | 2,046 | 4 | 19 | 31st October 1868. | |
| Bijawar | H. H. Maharaja Bhan Pratab Singh | 50 | 973·56 | 122,914 | 100 | 975 | 5 | 11 | 22nd November 1847. | |
| Charkhari | H. H. Maharaja Mulkhan Singh | 22 | 879·89 | 143,261 | 183 | 1,600 | 24 | 11 | 10th July 1880. | |
| Chhatarpur | H. H. Raja Vishwanath Singh | 26 | 1,240 | 173,874 | 40 | 1,276 | 34 | 11 | 4th November 1867. | |
| Datia | H. H. Maharaja Bhawani Singh | 47 | 836·80 | 185,728 | 937 | 4,999 | 48 | 15 | 20th November 1857. | |
| Dhar | H. H. Maharaja Sir Anand Rao Puar, K.C.S.I., C.I.E. | 48 | 1,739 | 167,504 | 367 | 1,877 | 5 | 15 | May 1860. | |
| Gwalior | H. H. Maharaja Madho Rao Sindhia | 16 | 29,047 | 3,378,774 | 5,504 | 11,040 | 48 | 19 | 3rd July 1886. | |
| Indore | H. H. Maharaja Sir Shivaji Rao Holkar, G.C S.I. | 33 | 8,400 | 1,091,689 | 3,244 | 5,238 | 24 | 19 | 12th July 1886. | |
| Jaora | Major H. H. Nawab Muhammad Ismail Khan | 37 | 872 | 112,280 | 63 | 719 | 4 | 13 | 30th April 1865. | |
| Jhabua | H. H. Raja Gopal Singh | 52 | 1,336 | 119,787 | 64 | 253 | 2 | 11 | 1841. | |
| Narsingarh | H. H. Raja Mahtab Singh | 53 | 720 | 112,427 | 318 | 450 | 8 | 11 | 28th June 1890. | |
| Orchha (or Tehri) | H. H. Maharaja Partap Singh | 38 | 1,933 | 333,389 | 350 | 4,400 | 90 | *17 | 15th March 1874. | * Including two guns personal. |
| Panna | H. H. Maharaja Mahindra Bahadur | ... | 2,568·33 | 239,052 | 165 | 1,507 | 13 | 11 | ...... | |
| Rajgarh (Bhopal) | H. H. Raja Balbahadur Singh | 35 | 642 | 122,641 | 300 | 360 | 2 | 11 | 6th July 1882. | |
| Ratlam | H. H. Raja Sajan Singh | 12 | 1,200 | 87,310 | 134 | 657 | 2 | 11 | 6th March 1893. | |
| Rewah | H. H. Maharaja Vyankatesh Raman Singh | 16 | 13,000 | 1,503,176 | 717 | 2,775 | 9 | 17 | 4th February 1880. | |
| *And one hundred and twenty-four Chiefs having less than 500 square miles of territory, or having territories the areas of which are not known.* | | | | | | | | | | |
| **In Rajputana.** | | | | | | | | | | |
| Alwar | H. H. Maharaja Jai Singh | 11 | 3,144 | 767,786 | 2,137 | 3,697 | 272 | 15 | 5th June 1892. | |
| Banswara† | H. H. Maharawal Lachhman Singh | 59 | 1,946 | 211,641 | 635 | 755 | 6 | 15 | 1842. | † Including its Feudatory, Kashalgarh. |
| Bhartpur | H. H. Maharaja Ram Singh | 22 | 1,982 | 640,303 | 1,643 | 7,856 | 12 | 17 | 19th December 1893. | |
| Bikanir | H. H. Maharaja Ganga Singh | 13 | 23,173 | 831,955 | 394 | 483 | 58 | 17 | 19th August 1887. | |
| Bundi | H. H. Maharao Raja Raghubir Singh, G.C.S.I., C.I.E. | 24 | 2,220 | 295,675 | 446 | 1,835 | 129 | 17 | 28th March 1889. | |
| Dholpur | H. H. Maharaj Rana Nihal Singh (*a*) | 30 | 1,154 | 279,890 | 138 | 1,546 | 17 | 15 | 9th February 1873. | |
| Dungarpur | H. H. Maharawal Udai Singh | 53 | 1,447 | 165,400 | 251 | 535 | 2 | 15 | 28th September 1846. | |
| Jaipur | H. H. Maharaja Sir Madho Singh, G.C.S.I. | 32 | 15,579 | 2,823,966 | 3,578 | 16,099 | About 140 | 19‡ | 18th September 1880. | ‡Including two guns personal. |
| Jaisalmir | H. H. Maharawal Salivahan Bahadur | 7 | 16,062 | 115,701 | 93 | 275 | 17 | 15 | 12th April 1891. | |
| Jhalawar | H. H. Maharaj Rana Zalim Singh | 28 | 2,722 | 343,601 | 403 | 3,873 | 84 | 15 | 24th June 1876. | |
| Jodhpur (Marwar) | H. H. Maharaja Sir Jaswant Singh, G.C.S.I. | 56 | 34,963 | 2,528,178 | 3,269§ | 3,548 | 75 | 21‖ | 13th February 1873. | § Including camel sowars. ‖ Including four guns personal. |
| Karauli | H. H. Maharaja Bhanwar Pal | 30 | 1,242 | 156,587 | 281 | 1,663 | 10 | 17 | 14th August 1886. | |
| Kishengarh | H. H. Maharaja Sir Sardul Singh, G.C.I.E. | 39 | 858 | 125,516 | 499 | 2,000 | 51¶ | 15 | 25th December 1879. | ¶ Serviceable and unserviceable. |
| Kotah | H. H. Maharao Umed Singh | 20 | 3,784 | 526,267 | 949 | 5,756 | 93 | 17 | 11th June 1889. | |
| Partabgarh | H. H. Maharawat Raghunath Singh | 35 | 886 | 87,975 | 327** | 454 | 2 | 15 | 18th February 1890. | ** Including feudatories. |
| Sirohi | H. H. Maharao Kesri Singh | 35 | 1,964 | 190,836 | 111 | 527 | 5 | 15 | 16th September 1875. | |
| Tonk | H. H. Nawab Sir Muhammad Ibrahim Ali Khan, G.C.I.E. | 44 | 2,552 | 380,069 | 510 | 2,081 | 77 | 17 | 20th December 1867. | |
| Udaipur (Meywar) | H. H. Maharana Sir Fateh Singh, G.C.S.I. | 44 | 12,753 | 1,863,126 | 5,560 | 14,186 | 257 | 19 | 21st December 1884. | |
| *And two Chiefs having less than 500 square miles of territory.* | | | | | | | | | | |

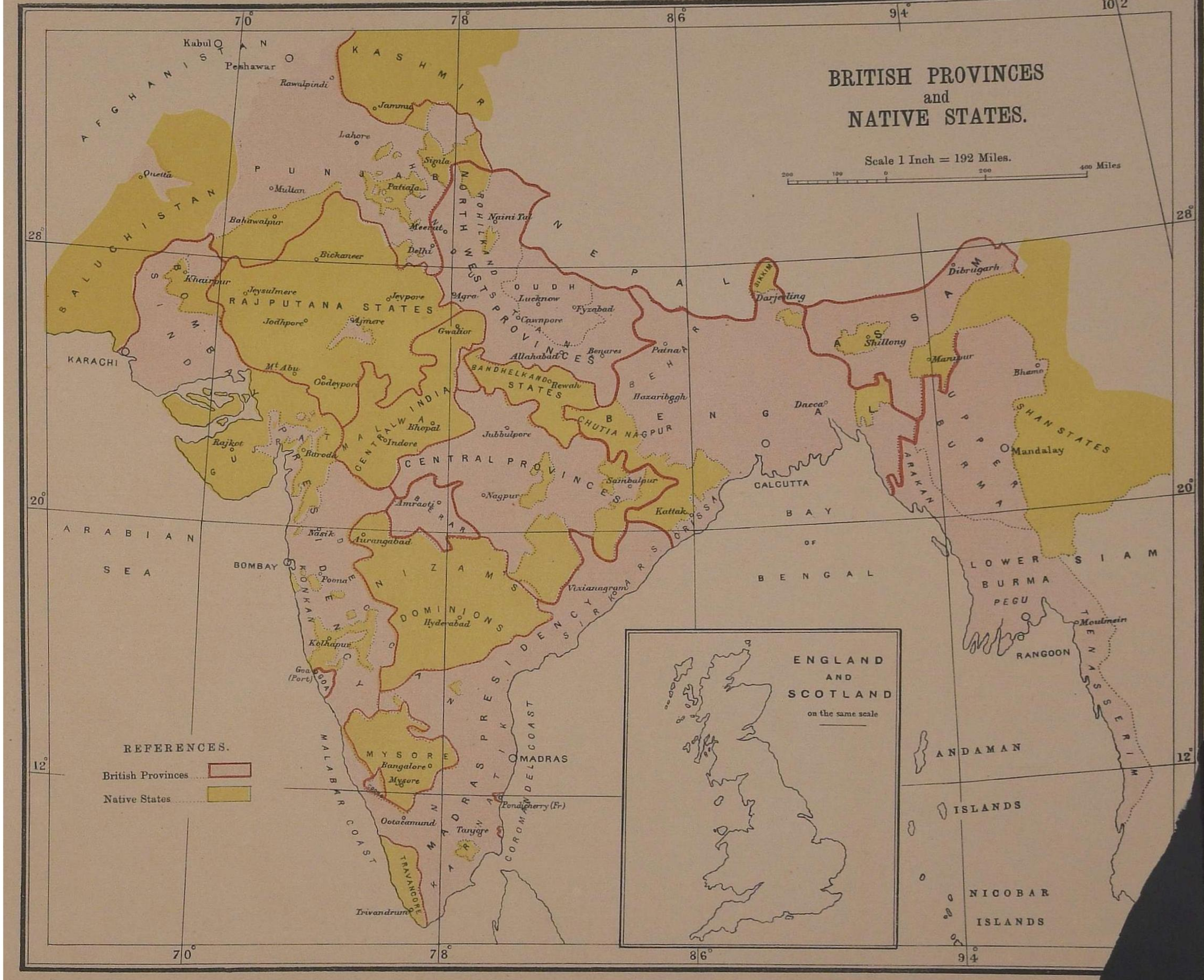
(*a*) The Chief is an Honorary Major in the British Army.

| Name of State. | Name and title of Chief. | Age of Chief. | Area of State in square miles. | Population of State. | Military Force. | | | Salute of Chief in guns. | Date of succession of Chief. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cavalry. | Infantry. | Serviceable guns. | | | |
| **Having Political Relations direct with the Government of Fort St. George.** | | | | | | | | | | |
| Cochin | H. H. Raja Sir Vira Kerala Varma, K.C.I.E. | 47 | 1,362 | 722,906 | 16 | 328 | 4 | 17 | 23rd July 1888. | |
| Pudukota | H. H. Raja Marthanda Bhairava Tondiman | 17 | 1,101 | 373,096 | 16 | 136 | 6 | 11 | 15th April 1886. | |
| Travancore | H. H. Maharaja Sir Rama Varma, G.C.S.I. | 35 | 6,730 | 2,557,736 | 61 | 1,442 | ... | 19 | 19th August 1885. | |
| *And two Chiefs having less than 500 square miles of territory.* | | | | | | | | | | |
| **Having Political Relations direct with the Government of Bombay.** | | | | | | | | | | |
| Bariya | Raja Man Singhji | 36 | 813 | 111,269 | 93 | 259 | 2 | 9 | 1864. | |
| Bhaunagar | H. H. Maharaja* Sir Takht Singhji Jaswat Singhji, G.C.S.I. | 34 | 2,860 | 467,282 | 442 | 2,596 | 6 | 15† | 13th April 1870. | * Personal title. † Including four guns personal. |
| Bhor | Pant Sachiv Shankar Rao Chimnaji | 38 | 1,491 | 155,488 | 35 | 114 | ... | ... | 12th February 1871. | |
| Chota Udaipur | Raja Moti Singhji | 32 | 873 | 93,637 | 58 | 258 | 3 | 9 | 7th July 1881. | |
| Dharampur | Raja Mohandevji Narayandevji | 29 | 706 | 120,498 | 59 | 147 | 3 | 9 | December 1891. | |
| Dhrangadra | H. H. Raj Sahib Sir Mansinghji Ranmal Singhji, K.C.S.I. | 55 | 1,156·5 | 103,754 | 51 | 289 | 6 | 15‡ | 28th October 1869. | ‡ Including four guns personal. |
| Gondal | H. H. Thakur Sahib Sir Bhagwat Singhji Sagramji, K.C.S.I. | 27 | 1,023·74 | 161,036 | 90 | 517 | 3 | 11 | 14th December 1869. | |
| Idar | H. H. Maharaja Sir Kesri Singhji Jawan Singhji, K.C.S.I. | 30 | 1,900 | 302,134 | 75 | 710 | 18 | 15 | 26th December 1868. | |
| Jath | Ramrao Appa Sahib | 7 | 979 | 79,786 | 8 | 300 | ... | ... | 13th January 1893. | |
| Jamkhandi | Ram Chundra Rao Gopal *alias* Appa Sahib | 58 | 555 | 102,162 | 52 | 914 | 1 | ... | 18th November 1840. | |
| Jetpur | Vala Lakshman Meram | 44 | 733·8 | 111,549 | 16 | 835 | 1 | ... | 17th September 1883. | |
| | Vala Suraj Ganga | 73 | | | | | | | 1st September 1847. | |
| | Vala Naja Kala and 18 other shareholders | 28 | | | | | | | 14th June 1890. | |
| Junagarh | H. H. Nawab Rasul Khanji Mahabat Khanji | 34 | 3,283·7 | 484,190 | 265 | 1,976 | 10 | 11 | 20th June 1892. | |
| Kankrej | 5 Shareholders | ... | 520 | 6,653 | ... | ... | ... | ... | ...... | |
| Kathi | Chandra Singh | 28 | 500 | 17,337 | ... | ... | ... | ... | April 1888. | |
| Khairpur | H. H. Mir Faiz Muhammad Khan | 52 | 6,109 | 131,937 | 700 | 774 | 28 | 15 | 8th April 1894. | |
| Kolhapur | H. H. Raja Shahu Chhatrapatti Maharaj | 18 | 2,855 | 913,131 | 251 | 1,211 | 58 | 19 | 17th March 1894. | |
| Kutch | H. H. Maharao Sir Khengarji Bahadur, G.C.I.E. | 26 | 6,500 | 558,415 | 359 | 1,425 | 2 | 17 | 1st January 1876. | |
| Morvi | H. H. Thakur Sahib Sir Waghji, K.C.I.E. | 34 | 821·6 | 105,335 | 131 | 331 | 2 | 11 | 17th February 1870. | |
| Navanagar | H. H. Jam Sir Vihaji Ranmalji, K.C.S.I. | 66 | 3,791·3 | 370,611 | 223 | 2,330 | 117 | 15 | 22nd February 1852. | |
| Palanpur | H. H. Diwan Sir Sher Muhammad Khan, K.C.I.E. | 40 | 3,150 | 274,864 | 121 | 439 | 16 | 11 | 19th September 1877. | |
| Porbandar | H. H. Rana Vikramatji Khimaji | 73 | 636·5 | 85,785 | 25 | 344 | 5 | 11§ | 20th June 1831. | § The present Chief has been deposed and is allowed this salute only outside Kathiawar in British India. |
| Radhanpur | H. H. Nawab Muhammad Bismillah Khan | 50 | 1,150 | 98,017 | 100 | 190 | 2 | 11 | 9th October 1874. | |
| Rajpipla | H. H. Raja Ghambhir Singhji | 45 | 1,514 | 171,771 | 73 | 514 | 4 | 11 | 1860. | |
| Sangli | Dhundi Rao Chintaman *alias* Tatia Sahib | 54 | 1,083 | 238,945 | 54 | 428 | 3 | ... | 15th July 1851. | |
| Sawantwari | Sir Desai Raghunath Sawant Bhonsle Raje Bahadur. | 30 | 926 | 192,948 | 10 | 400 | 2 | 9 | 29th August 1870. | Has no jurisdiction owing to personal incapacity. |
| *And three hundred and thirty-six Chiefs having less than 500 square miles of territory, or having territories, the areas of which are not known.* | | | | | | | | | | |
| **Having Political Relations direct with the Government of Bengal.** | | | | | | | | | | |
| Athmalik | Maharaja Mahendra Deo Sawant | 45 | 730 | 31,605 | ... | 360 | ... | ... | 4th February 1877. | |
| Bod | Raja Jogendra Deo | 35 | 1,264 | 89,551 | ... | 592 | ... | ... | 5th October 1879. | |
| Bonai | Raja Inder Deo | 54 | 1,297 | 32,120 | ... | ... | ... | ... | 12th September 1876. | |
| Chang Bhakar | Bhaya Balbhadara Singh | 66 | 906 | 18,526 | ... | ... | ... | ... | 1st December 1865. | |
| Daspalla | Raja Chaitan Deo Bhanj | 39 | 568 | 45,597 | ... | 897 | ... | ... | 29th November 1872. | |

| Name of State. | Name and title of Chief. | Age of Chief. | Area of State in square miles. | Population of State. | Military Force. Cavalry. | Military Force. Infantry. | Military Force. Serviceable guns. | Salute of Chief in guns. | Date of succession of Chief. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| **Having Political Relations direct with the Government of Bengal—*continued.*** | | | | | | | | | | |
| Dhenkanal | Raja Sura Pratap Mahindra | 9 | 1,463 | 238,285 | ... | 343 | ... | ... | 29th August 1885. | |
| Gangpur | Raja Raghunath Sikhar Deo | 41 | 2,484 | 198,915 | ... | ... | ... | ... | 28th November 1858. | |
| Jashpur | Raja Pratap Narayan Singh Deo, C.I.E. | 69 | 1,947 | 113,636 | ... | ... | 2 | ... | 24th October 1845. | |
| Keonjhar | Maharaja* Dhanurjai Narayan Bhanj Deo | 43 | 3,096 | 248,101 | 11 | 8,761 | 6 | ... | 4th September 1861. | * Personal title. |
| Korea | Raja Pran Singh Deo | 34 | 1,631 | 36,240 | ... | ... | ... | ... | 4th April 1864. | |
| Kuch Bahar | Lieut.-Col.† H. H. Maharaja Sir Nripendra Narayan Bhup Bahadur, G.C.I.E. | 29 | 1,307 | 578,054 | 9 | 176 | 4 | 13 | August 1863. | † The Chief is an Honorary Lieutenant-Colonel in the British Army. |
| Morbhanj | Raja Sriram Chundra Bhanj Deo | 20 | 4,243 | 532,238 | ... | 512 | ... | ... | 29th May 1882. | |
| Nayagarh | Raja Raghunath Singh Mandhata | 32 | 588 | 117,862 | ... | 741 | ... | ... | 2nd March 1890. | |
| Sarguja | Maharaja‡ Raghunath Sarun Singh | 31 | 6,103 | 324,552 | ... | ... | ... | ... | 25th March 1879. | ‡ Personal title. |
| Sikkim | H. H. Maharaja Thotab Namgyel | 30 | 2,702 | 30,500 | ... | 5,000§ | ... | 15 | April 1874. | § Irregulars—not a standing force. |
| Hill Tipperah | H. H. Maharaja‖ Bir Chandra Manikya Deb Barman. | 54 | 4,086 | 137,442 | ... | 304 | 5 | 13 | 31st July 1862. | ‖ Personal title. |
| Udaipur | Raja Dharmjit Singh Deo | 35 | 1,051 | 32,536 | ... | ... | 3 | ... | 18th March 1876. | |
| *And twelve Chiefs having less than 500 square miles of territory.* | | | | | | | | | | |
| **Having Political Relations direct with the Government of the North-Western Provinces and Oudh.** | | | | | | | | | | |
| Rampur | H. H. Nawab Hamid Ali Khan | 18 | 945 | 551,249 | 538 | 2,673 | 26 | 13 | 27th February 1889. | |
| Tehri (Garhwal) | H. H. Raja Kirti Sah | 19 | 4,164 | 241,242 | ... | ... | ... | 11 | 6th February 1887. | |
| **Having Political Relations direct with the Government of the Punjab.** | | | | | | | | | | |
| Bahawalpur | H. H. Nawab Sir Sadik Muhammad Khan, G.C.S.I. | 31 | 17,285 | 650,042 | 454 | 1,341 | 10 | 17 | 25th March 1866. | |
| Bashahr | Raja Shamsher Singh | 55 | 3,300 | 75,727 | ... | 100 | ... | ... | 12th February 1850. | |
| Chamba | H. H. Raja Sham Singh | 27 | 3,126 | 124,032 | 12 | 200 | 2 | 11 | 17th April 1873. | |
| Faridkot | H. H. Raja Bikram Singh | 51 | 643 | 115,040 | 70 | 300 | 6 | 11 | 22nd April 1874. | |
| Jind | H. H. Raja Ranbir Singh | 14 | 1,268 | 284,560 | 372 | 1,550 | 16 | 11 | 7th March 1887. | |
| Kapurthala | H. H. Raja Jagat Jit Singh | 20 | 598 | 299,690 | 203 | 885 | 8 | 11 | 5th September 1877. | |
| Mandi | H. H. Raja Bije Sain | 47 | 1,131 | 166,923 | 20 | 154 | 5 | 11 | 26th January 1851. | |
| Nabha | H. H. Raja Sir Hira Singh, G.C.S.I. | 50 | 936 | 282,756 | 344 | 1,397 | 10 | 13¶ | 9th June 1871. | ¶ Including two guns personal. |
| Patiala | H. H. Maharaja Rajendro Singh Mahendra Bahadur. | 22 | 5,951 | 1,583,521 | 2,372 | 4,277 | 24 | 17 | 14th April 1876. | |
| Sirmur (Nahan) | H. H. Raja Sir Shamsher Prakash, G.C.S.I. | 50 | 1,108 | 124,134 | 100 | 408 | ... | 13** | 4th July 1857. | ** Including two guns personal. |
| *And twenty-four Chiefs having less than 500 square miles of territory.* | | | | | | | | | | |
| **Having Political Relations direct with the Chief Commissioner of the Central Provinces.** | | | | | | | | | | |
| Bamra | Raja Sudhal Deo, C.I.E. | 44 | 1,988 | 104,367 | ... | ... | ... | ... | 12th May 1869. | |
| Bastar | Raja Rudra Pratap Deo | 8 | 13,062 | 310,884 | ... | ... | ... | ... | 20th November 1891. | |
| Kanker | Maharaj Adhiraj Narhar Deo | 43 | 1,429 | 82,379 | ... | ... | ... | ... | 1853. | |
| Karond (or Kala Handi). | Raja Raghu Keshar Deo | 22 | 3,745 | 326,295 | ... | ... | ... | 9 | 7th April 1881. | |
| Kawardha | Thakur Kritpal Singh | 7 | 798 | 91,813 | 9,922 | ... | ... | ... | 5th May 1892. | |
| Khairagarh | Zamindar Kamal Narayan Singh | 23 | 931 | 181,184 | ... | ... | ... | ... | 19th February 1891. | |
| Nandgaon | Raja* Balram Das Bahadur | 28 | 871 | 183,866 | ... | ... | ... | ... | 4th November 1883. | * Personal title. |
| Patna | Maharaja Ram Chandra Singh Deo | 22 | 2,399 | 332,197 | ... | ... | ... | ... | 25th November 1878. | |

| Name of State. | Name and title of Chief. | Age of Chief. | Area of State in square miles. | Population of State. | Military Force. | | | Salute of Chief in guns. | Date of succession of Chief. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cavalry. | Infantry. | Serviceable guns. | | | |
| **Having Political Relations direct with the Chief Commissioner of the Central Provinces**—*continued.* | | | | | | | | | | |
| Raigurh-Bargarh | Raja Bhup Deo Singh | 25 | 1,486 | 168,525 | ... | ... | ... | ... | 7th June 1890. | |
| Rairakhol | Raja Bishan Chandra Janamuni | 73 | 833 | 20,335 | ... | ... | ... | ... | 1825. | |
| Sarangarh | Raja Lal Jawahir Singh | 5 | 540 | 83,210 | ... | ... | ... | ... | 2nd October 1890. | |
| Sonpur | Raja Pratap Rudra Singh Deo | 38 | 906 | 195,245 | ... | ... | ... | ... | 5th November 1891. | |
| *And three Chiefs having less than 500 square miles of territory.* | | | | | | | | | | |
| **Having Political Relations direct with the Chief Commissioner of Assam.** | | | | | | | | | | |
| Manipur | H. H. Raja Chura Chand | 8 | 8,000 | 221,070 | ... | 400 | ... | 11 | 18th September 1891. | |
| *And fifteen Chiefs, the areas of whose territories are not known.* | | | | | | | | | | |

G. I. C. P. O.—No. 452 R. & A. D.—10-7-95.—2,000.

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